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NEVADA WATERSHED STUDIES ANNUAL REPORT 1978



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
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NEVADA WATERSHED STUDIES
ANNUAL REPORT, 1978

United States
Department of the Interior
Bureau of Land Management
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Date *June 29, 1978*

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Date *6-29-78*

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Date *6-29-78*

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ACKNOWLEDGEMENT

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PREFACE

Runoff

The original purpose of the Nevada Watershed Studies was to provide information on runoff from snow and rainfall on BLM-administered lands in Nevada. This information would then be used for design of structural measures - flood irrigation systems and road and dam construction projects.

The Nevada Watershed Studies over the past 12-15 years have provided mostly negative runoff information. Overland flows and gully runoff from small watersheds, for example, are generally absent on an annual, recurring basis.

However, based on runoff information thus far recorded, and in the process of being analyzed, overland flows that present a flood hazard can be identified and economical solutions proposed.

INTRODUCTION

The Nevada Watershed Studies were instrumented in the early 1960s. This first Annual Report is a presentation of data collected from twelve hydro areas, two located in each district. Though this first report presents as much as 15 years of data (some hydros date back to 1962), in the years to come, a report will be issued by the Nevada State Office (NSO) annually.

The report has two fundamental parts: (1) the text, containing data analyses, and (2) appendices, containing precipitation can data for each hydro. Though some cans will soon be dropped, all the cans are included in the appendices.

The purpose of the studies is to provide hydrologic information from a dense network of rain cans, automatic recorders, and peak gages within relatively small watersheds. Data from these instrumented areas can then be extrapolated to similar non-instrumented areas within the Great Basin. The instrumentation, located at various elevations and exposures, provides a better picture of Nevada's climate than would be possible if only National Weather Service information was available.

New instrumentation will be placed in the hydro areas when deemed advisable, funds permitting. In 1978, soil moisture blocks are being placed in the hydros. Future reports will include data from any new instrumentation.

The rain can appendices data is in raw form, in the sense that it has not been interpreted and analyzed at that stage. Therefore, it is essential that appendix material NOT be used to make value judgments as to Nevada's climatic regime. The appendix material is being made available to readers since it was used by NSO personnel in the analyses.

The monthly and annual precipitation averages were computed through 1976. The year 1977 could not be figured into the averages for the report because the 1977 precipitation amounts are not yet available through December 1977. Because automatic recorder charts are used to proportion out monthly rain can amounts, the latter months of 1977 can not yet be proportioned since the appropriate charts are still on the recorders as of this writing. Early 1977 rain can data is included in the appendices.

The monthly and annual averages for selected rain cans have been subjected to analyses as presented in Nevada BLM Manual Supplement 9173.4, Computation of Mean Annual Rainfall and Frequency of

Daily Rains. It is necessary to focus on the interpreted data presented in the text, rather than on the raw data in the appendices.

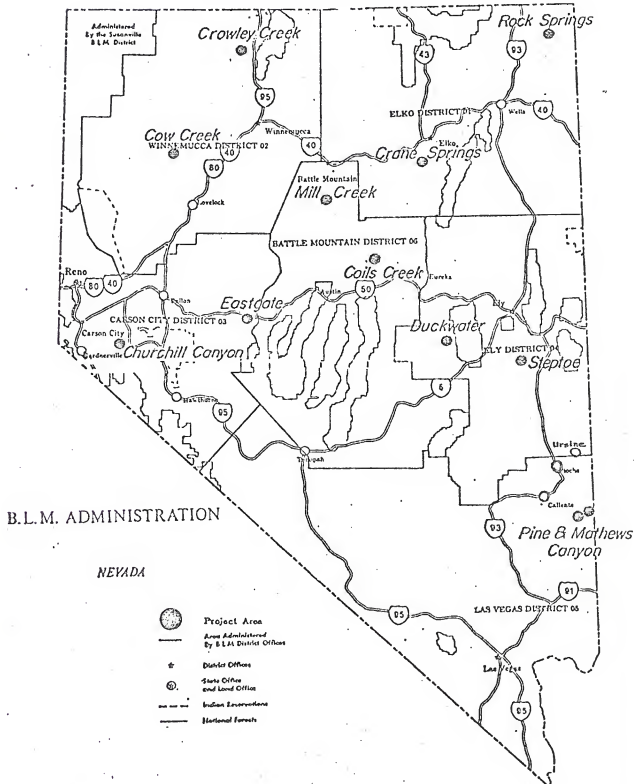
The interpreted data is the result of the raw data being analyzed in terms of Nevada's precipitation-triggering mechanisms: (1) frontal storms from the Pacific Ocean, (2) cyclonic activity originating over the continent, and (3) mid-summer convective thunderstorms deriving moisture from air masses that have swept into Nevada from the tropical oceans. Since the Nevada Watershed Studies interpreted data has been analyzed to fit these weather control mechanisms, the 12 to 15 years of short-term records have been made to simulate long-term records (30 years or more) with reasonable accuracy. The raw appendix data merely shows monthly precipitation amounts and their averages over the periods of record, prior to the data being subjected to weather mechanism analysis. Hence, only the interpreted data contained in the text should be used to make land management decisions.

Instrumentation, Nevada Watershed Studies (as of 1977)

Watershed	District	Data Collec- tion Started	Recording Stream Gage No.	Crest Stage Gage No.	Precipitation Gage		Drainage Area Sq. Mile	Average Area Per Precip. Gage Sq. Mile
					Tipping Bucket	Cans* No.		
Rock Springs	Elko	6/63	1	4	3	20	77	3.3
Crane Springs	Elko	7/64	1	1	3	11	30	2.1
Crowley Creek	Winnemucca	7/62	1	4	3	17	56	2.8
Cow Creek	Winnemucca	10/64	1	3	3	17	115	5.7
Eastgate	Carson City	2/63	1	5	4	22	213	7.9
Churchill Canyon	Carson City	9/63	1	3	3	16	73	3.8
Duckwater	Ely	1/63	2	6	4	24	96	3.5
Steptoe	Ely	11/63	1	2	4	13	45	2.8
Pine Canyon	Las Vegas	8/62	1	3	2	9	32	2.9
Mathews Canyon	Las Vegas	8/62	1	4	2	12	36	2.6
Coils Creek	Battle	7/63	1	4	3	18	50	2.4
Mill Creek	Mountain	6/64	1	2	3	12	23	1.5

*Note: Number of rain cans subject to change.

NEVADA WATERSHED STUDIES AREA LOCATION MAP



General Descriptions of the Watershed Areas

Rock Springs

Location: latitude 41°49'N, longitude 114°23'W. Located north-east of Wells, Nevada, within BLM's Elko District.

Annual precipitation: averages between 10 and 17 inches.

Temperatures: mean annual temperature is approximately 45 degrees F.

Geology: Paleozoic sedimentary and metamorphic rocks, Tertiary sedimentary rocks, and Quaternary alluvium.

Soils: shallow, undeveloped soils in mountains. Deep, fine-textured soils in valleys.

Physiography: rugged mountains with valleys. Elevations range from about 5,400 feet to 7,600 feet; with a median elevation of 5,800 feet.

Drainage: south to Thousand Spring Creek.

Dominant vegetation: grass, sagebrush, pinyon-juniper woodland.

Crane Springs

Location: latitude 40°32'N, longitude 115°51'W. Located 15 miles southwest of Elko, Nevada, within BLM's Elko District.

Annual precipitation: averages between 10 and 14 inches.

Temperatures: mean annual temperature is approximately 45 degrees F. ranging from a low of -42°F. to a high of 107°F.

Geology: sandstone, some andesite and dolomite, and alluvium.

Soils: Aridisols, with a few Entisols and Mollisols.

Physiography: elevations range between 5,200 feet and 6,800 feet, with relief between the mountains and adjoining valleys rarely exceeding 1,000 feet. Median elevation is 5,500 feet.

Drainage: northwest to the Humboldt River. Ephemeral streams flow from thunderstorms and snow melt.

Vegetative zones: salt desert shrub, northern desert shrub, and juniper woodland.

Crowley Creek

Location: latitude 41°37'N, longitude 118°03'W. Located north of Winnemucca, Nevada, within BLM's Winnemucca District.

Annual precipitation: averages between 10 and 14 inches.

Temperatures: mean annual temperature is approximately 48 degrees F.

Geology: Quaternary and Tertiary volcanic and sedimentary rocks, Quaternary alluvium.

Soils: shallow, undeveloped soils on ridges. Deep, fine-textured soils in valleys.

Physiography: mountain ridges and deep-cut valleys. Elevations range from about 4,500 feet to 7,500 feet, with a median elevation of 5,000 feet.

Drainage: southwest to the Quinn River.

Dominant vegetation: grass and sagebrush.

Cow Creek

Location: latitude 40°43'N, longitude 118°45'W. Located 42 miles northwest of Lovelock, Nevada, within BLM's Winnemucca District.

Annual precipitation: averages between 6 and 10 inches.

Temperatures: mean annual temperature is 52 degrees F., ranging from a low of -30°F. to a high of 110°F.

Geology: andesite, with some shale, conglomerate, and sandstone. Alluvium.

Soils: Aridisols, with some Entisols and Mollisols.

Physiography: elevations range from 4,300 feet to 7,000 feet, with relief between mountains and adjoining canyons or valleys rarely exceeding 2,100 feet. Median elevation is 4,800 feet.

Drainage: northwest to Black Rock Desert. Ephemeral streams flow from thunderstorms and snow melt. Some perennial springs are present.

Vegetative zones: salt desert shrub, northern desert shrub, and juniper woodland.

Eastgate

Location: latitude 39°19'N, longitude 117°52'W. Located east of Fallon, Nevada, within BLM's Carson City District.

Annual precipitation: averages between 7 and 13 inches.

Temperatures: mean annual temperature is approximately 50 degrees F.

Geology: granitic rocks and Quaternary alluvium.

Soils: shallow, undeveloped soils in mountains. Deep, fine-textured soils in valleys.

Physiography: elevations range from about 4,900 feet to 9,000 feet, with median elevation of 6,000 feet.

Dominant vegetation: sagebrush, greasewood, pinyon-juniper woodland.

Churchill Canyon

Location: latitude 39°02'N, longitude 119°17'W. Located southeast of Carson City, Nevada, within BLM's Carson City District.

Annual precipitation: averages between 6 and 14 inches.

Temperatures: mean annual temperature is approximately 50 degrees F.

Geology: granitic rocks and Quaternary alluvium.

Soils: shallow, undeveloped soils in mountains. Deep alluvium and fine to rocky soils in valleys.

Physiography: mountainous with broad valleys. Elevations range from about 4,300 feet to 7,000 feet, with a median elevation of 5,500 feet.

Drainage: northeast, then south to the Walker River.

Dominant vegetation: sagebrush, pinyon-juniper woodland.

Duckwater

Location: latitude 39°07'N, longitude 115°42'W. Located mostly in White Pine County, about 30 miles southeast of Eureka, Nevada, in the Pancake Range, within BLM's Ely District.

Annual precipitation: averages between 8 and 12 inches, most of which falls as snow during winter and early spring.

Temperatures: mean annual temperature is 43 degrees F., ranging from a low of -34°F. to a high of 99°F. at the lower elevations.

Geology: primarily sedimentary rocks and volcanics - limestone, andesite, tuff, basalt, and alluvium.

Soils: Aridisols and Entisols.

Physiography: 55 percent alluvial fans, 5 percent floodplains, and 40 percent mountains. Elevations range between 5,800 feet and 7,300 feet, with median elevation of 6,300 feet.

Drainage: south to Railroad Valley. Ephemeral streams flow from thunderstorms and snow melt.

Dominant vegetation: big sagebrush, black sagebrush, winterfat, shadscale, juniper, and single-leaf pinyon.

Steptoe

Location: latitude 38°50'N, longitude 114°47'W. Located about 24 miles southeast of Ely, Nevada, within BLM's Ely District.

Annual precipitation: averages between 11 and 15 inches, most of which falls as snow during winter and early spring.

Temperatures: mean annual temperature is 44 degrees F., ranging from a low of -26°F. to a high of 97°F. at the lower elevations.

Geology: primarily limestone and alluvium.

Soils: Aridisols and Mollisols.

Physiography: 30 percent alluvial fans, 3 percent floodplains, and 67 percent mountains. Elevations range between 7,100 feet and 9,000 feet, with median elevation of 7,400 feet.

Drainage: north to Steptoe Valley. Ephemeral streams flow from thunderstorms and snow melt. Some perennial springs exist in the area.

Dominant vegetation: big sagebrush, low sagebrush, bitterbrush, juniper, single-leaf pinyon, bluebunch wheatgrass, and crested wheatgrass.

Pine Canyon and Mathews Canyon

Location: Pine Canyon - latitude 37°30'N, longitude 114°12'W; Mathews Canyon - latitude 37°33'N, longitude 114°07'W. Located about 18 miles southeast of Caliente, Nevada, within BLM's Las Vegas District.

Annual precipitation: averages between 12 and 17 inches, most of which comes as snow during winter and as rain during late summer.

Temperatures: mean annual temperature is 50 degrees F., ranging from a low of 0°F. to a high of 101°F.

Geology: old lake bed sediments and volcanics - silt, sand, tuffaceous clay, ignimbrite, tuff, and andesite.

Soils: primarily Aridisols and Mollisols, with some Entisols.

Physiography: 60 percent alluvial fans, 5 percent floodplains, and 35 percent mountains. Elevations range between 5,600 feet and 6,700 feet, with median elevation of 5,700-5,800 feet.

Drainage: northwest to Meadow Wash and the Colorado River. Perennial springs are numerous. Ephemeral streams flow from thunderstorms and snow melt.

Dominant vegetation: big sagebrush, black sagebrush, juniper, single-leaf pinyon, rubber rabbitbrush, crested wheatgrass, squirreltail, and cheatgrass.

Coils Creek

Location: latitude 39°45'N, longitude 116°40'W. Located in Eureka County, about 32 miles northwest of Eureka, Nevada, within ELM's Battle Mountain District.

Annual precipitation: averages between 7 and 13 inches, most of which comes as snow during winter and early spring.

Temperatures: mean annual temperature is 47 degrees F., ranging from a low of -26°F. to a high of 110°F.

Geology: sedimentary rocks and volcanics - limestone, sandstone, shale, basalt, and alluvium.

Soils: Aridisols, Entisols, and Mollisols.

Physiography: 40 percent alluvial fans, 5 percent floodplains, and 55 percent mountains. Elevations range between 6,500 feet and 8,400 feet, with median elevation of 6,800 feet.

Drainage: south to Kobeh Valley. Ephemeral streams flow from thunderstorms and snow melt. A number of springs are present.

Dominant vegetation: big sagebrush, low sagebrush, juniper, single-leaf pinyon, snowberry, bluebunch wheatgrass, cheatgrass, and squirreltail.

Mill Creek

Location: latitude 40°28'N, longitude 116°53'W. Located in Lander County, about 20 miles south of Battle Mountain, within BLM's Battle Mountain District.

Annual precipitation: averages between 10 and 16 inches.

Temperatures: mean annual temperature is 49 degrees F., ranging from a low of -40°F. to a high of 108°F.

Geology: alluvium, shale, volcanics - rhyolite and dacite - and quartzite.

Soils: Aridisols, with some Entisols and Mollisols.

Physiography: elevations range between 5,050 feet and 8,000 feet, with relief between the ridges and adjoining canyons rarely exceeding 2,000 feet. Median elevation is 6,000 feet.

Drainage: Mill Creek is a perennial stream which supports game fish. Ephemeral streams flow from thunderstorms and snow melt. Numerous perennial springs exist in the area. Drainage is northwest to the Reese River.

Vegetative zones: salt desert shrub, northern desert shrub, and pinyon-juniper woodland.

DISTRICT REPORT SECTION

Types of Storms and Seasonal Distribution

Moisture moves into the Great Basin from two sources, the Pacific Ocean and tropical oceans. The Pacific Ocean is the more important, providing moisture from October to June. The tropical oceans supply moisture from July through mid-September.

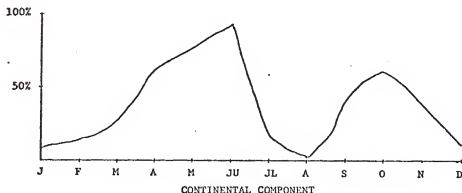
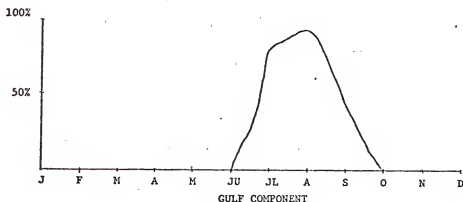
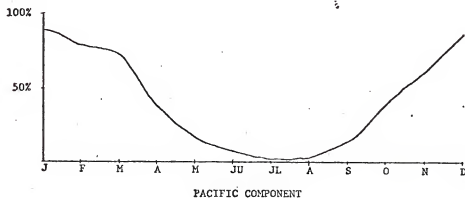
There are three precipitation-triggering mechanisms, or components, at work in the Great Basin. Each represents a particular storm type having a prescribed seasonal pattern.

The Pacific component represents transitory frontal systems from the Pacific. These frontals are most active during the winter months, and to a lesser degree during the spring and fall.

The Continental component represents cyclonic activity originating over the continent. Cyclonic activity is most frequent during the spring and fall when the interaction of contrasting air masses is most favorable to cyclonic development. The Continental component has a primary spring precipitation peak with a secondary peak in fall, corresponding to maximum frequency of Great Basin low pressure systems.

The Gulf component represents scattered, convective thunderstorms produced by surface heating of the air which then rises to trigger precipitation from moist air aloft. The summer convective thunderstorms are the least effective storm type in providing soil moisture because of their short duration, and because they have limited areal extent and occur when evaporation rates are highest.

MONTHLY CONTRIBUTION OF EACH COMPONENT AS A PERCENT
OF TOTAL MONTHLY PRECIPITATION



*Note: It is important to realize that these generalized curves represent PERCENTAGE contributions, NOT magnitudes. For example, the Gulf component generally contributes between 90% and 100% of the August precipitation, depending upon location in the Great Basin. But this high percentage contribution in no way approaches the MAGNITUDE of the Pacific component's contribution in January. While .30 inch may fall in August, 1.00 inch may fall in January, even though the percentage contributions of the components are similar for August and January, respectively.

Long-term Averages With Standard Deviations and Observed Averages Graphed For Selected Cans

The following graphs depict the long-term averages by month, plus or minus one standard deviation, for selected cans. These long-term means have been computed using the observed rain can averages (also depicted in graph form) over the period of record. These observed averages were then fitted to the Pacific, Continental, and Gulf annual curves (derived from a data base period of 1931-1960) which represent the behavior of the precipitation-triggering mechanisms. The long-term averages were computed from this curve fitting.

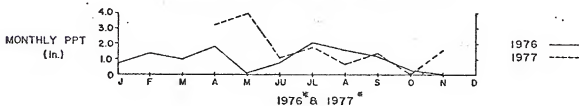
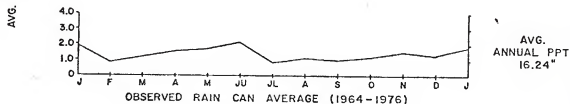
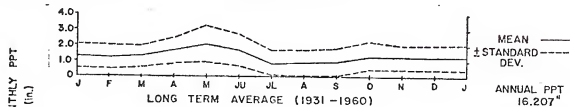
For comparison, the observed monthly can readings, as proportioned from the nearest precipitation recorder chart information, are included for 1976 and the first part of 1977. These recent can observations should provide a comparison between present trends and the calculated long-term averages.

Two cans were selected from each hydro area and subjected to complete analyses. Every effort was made to select two of the most representative cans (with the best data collection records) within each hydro, one can at a higher and one can at a lower elevation. Although observed averages (short-term means) have been proportioned for every can in each hydro (see appendix section), it has been necessary to limit the analyses to two cans per hydro, taking them through various statistical treatments. If District personnel wish to see long-term mean computations for any cans not discussed in this report, arrangements may be made with Nevada State Office personnel.

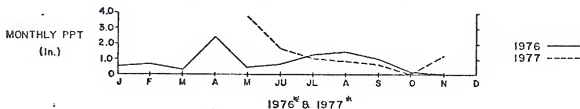
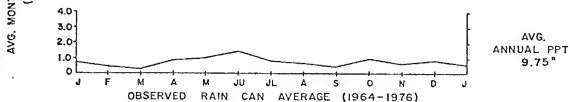
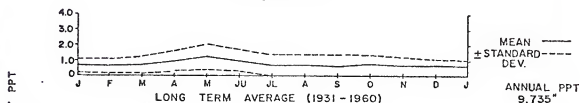
ROCK SPRINGS HYDRO STUDY

LATITUDE - 41° 49'
LONGITUDE - 114° 20'

CAN #5
ELEVATION - 6480



CAN #11
ELEVATION - 5700



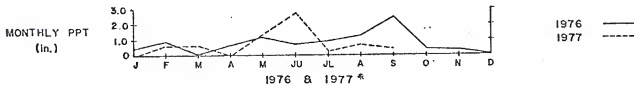
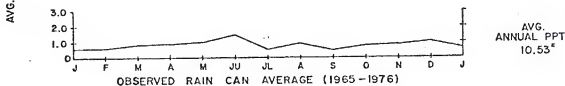
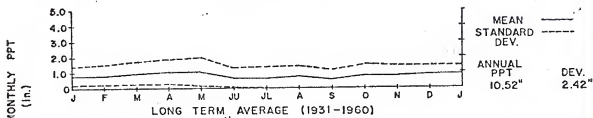
DATA RECORD INCOMPLETE

CRANE SPRINGS HYDRO STUDY

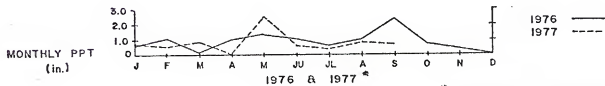
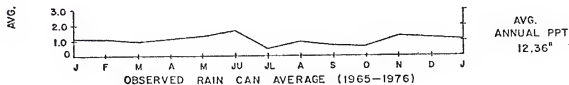
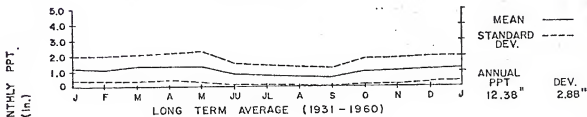
LATITUDE - 40° 32'

LONGITUDE - 115° 50'

CAN # 1
ELEV. - 5,320



CAN # 11
ELEV. - 6,350

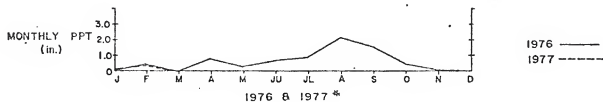
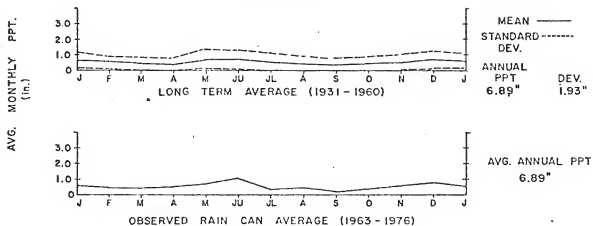


*DATA RECORD INCOMPLETE

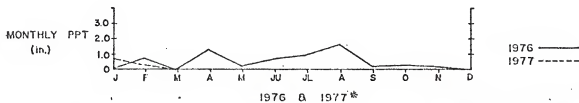
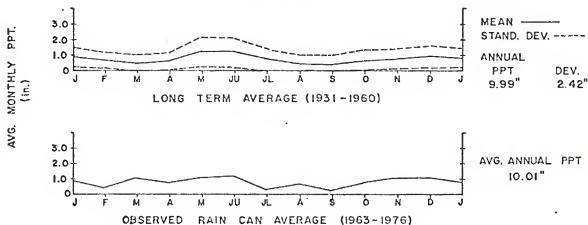
COW CREEK HYDRO STUDY

LATITUDE - 40° 43'
LONGITUDE - 118° 45'

CAN # 2
ELEV. - 4600'



CAN # 16
ELEV. - 5900'

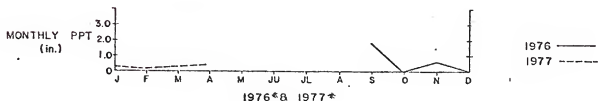
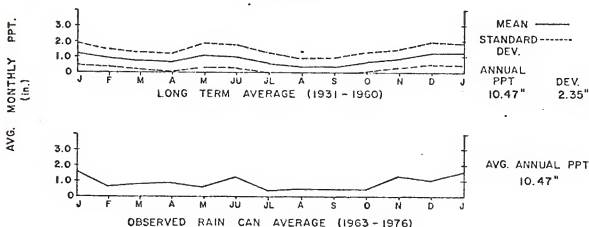


* MISSING OR UNPROPORTIONABLE DATA

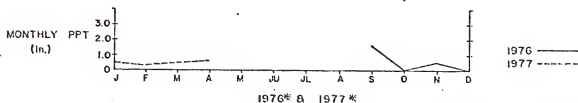
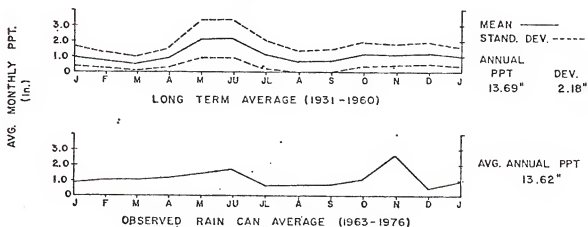
CROWLEY CREEK HYDRO STUDY

LATITUDE - 41° 37'
LONGITUDE - 118° 03'

CAN # 2
ELEV. - 4840'



CAN # 10
ELEV. - 6900'

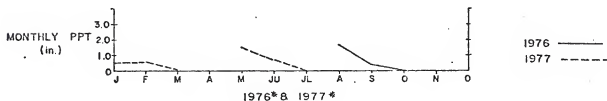
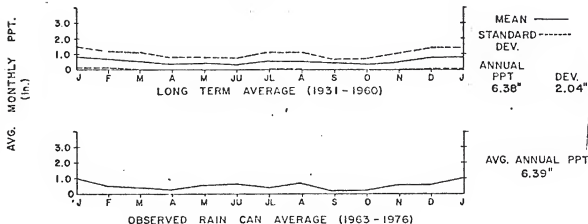


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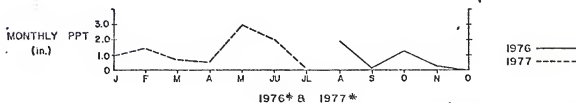
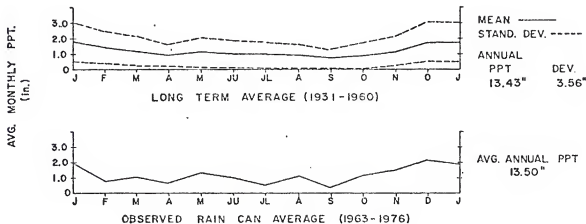
CHURCHILL CANYON HYDRO STUDY

LATITUDE- 39° 02'
LONGITUDE- 119° 17'

CAN # 2
ELEV.- 4760'



CAN # 10
ELEV.- 6400'

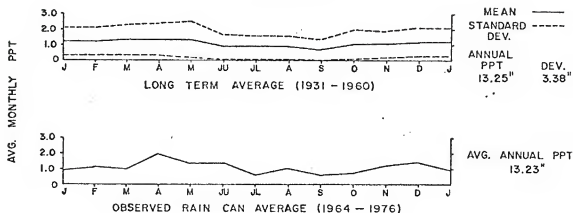


* MISSING OR UNPROPORTIONABLE DATA

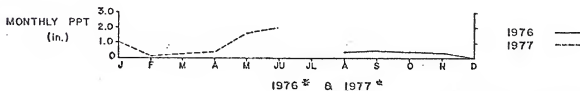
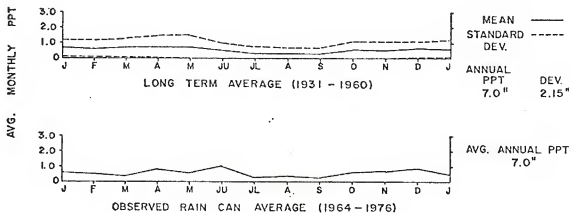
EASTGATE HYDRO STUDY

LATITUDE - 39° 19'
LONGITUDE - 117° 52'

CAN #15
ELEV. - 7700'



CAN #22
ELEV. - 5000'

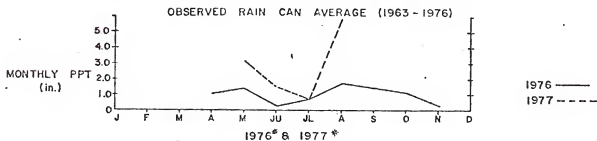
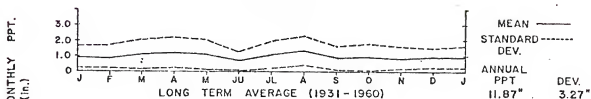


* Data record Incomplete

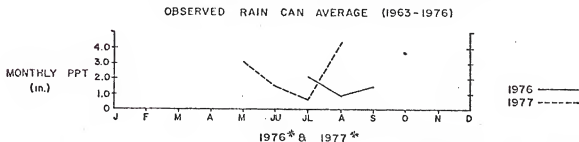
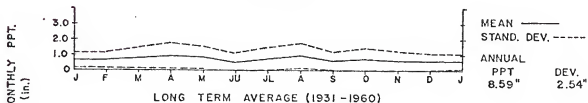
DUCKWATER HYDRO STUDY

LATITUDE - 39° 07'
LONGITUDE - 115° 42'

CAN # 16
ELEV. - 6675'



CAN # 24
ELEV. - 6090'



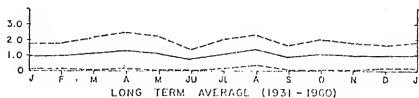
* MISSING OR UNPROPORTIONABLE DATA

STEPTOE HYDRO STUDY

LATITUDE - 38° 50'
LONGITUDE - 114° 47'

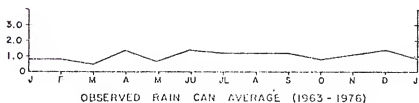
CAN # 6
ELEV. - 7400'

AVG. MONTHLY PPT.
(in.)



MEAN ———
STANDARD DEV. - - -
ANNUAL PPT 13.0"
DEV. 3.64"

AVG. MONTHLY PPT.
(in.)



AVG. ANNUAL PPT
12.99"

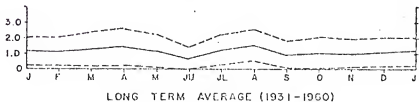
MONTHLY PPT
(in.)



1976 ———
1977 - - -

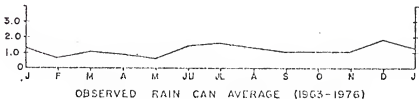
CAN # 10
ELEV. - 7900'

AVG. MONTHLY PPT.
(in.)



MEAN ———
STAND. DEV. - - -
ANNUAL PPT 14.62"
DEV. 3.95"

AVG. MONTHLY PPT.
(in.)



AVG. ANNUAL PPT
14.66"

MONTHLY PPT
(in.)



1976 ———
1977 - - -

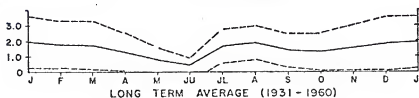
* DATA RECORD INCOMPLETE

PINE CANYON HYDRO STUDY

LATITUDE - 37° 30'
LONGITUDE - 114° 12'

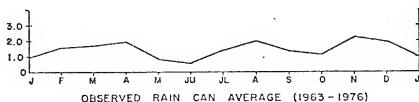
CAN # 3
ELEV. - 6200'

AVG. MONTHLY PPT.
(in.)



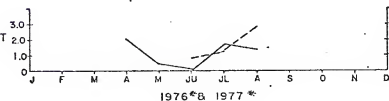
MEAN —
STANDARD DEV. ---
ANNUAL PPT 17.0"
DEV. 5.0"

AVG. MONTHLY PPT.
(in.)



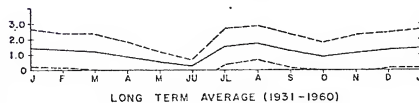
AVG. ANNUAL PPT
16.98"

MONTHLY PPT
(in.)



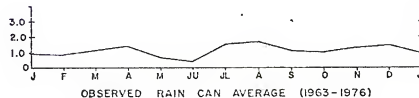
CAN # 8
ELEV. - 5750'

AVG. MONTHLY PPT.
(in.)



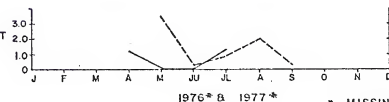
MEAN —
STAND. DEV. ---
ANNUAL PPT 13.32"
DEV. 4.17"

AVG. MONTHLY PPT.
(in.)



AVG. ANNUAL PPT
13.34"

MONTHLY PPT
(in.)

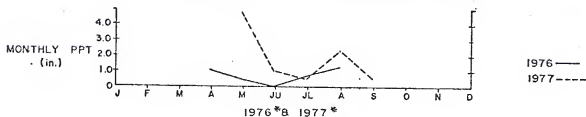
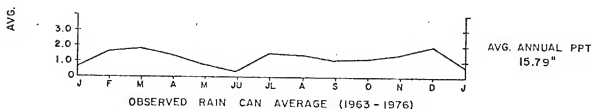
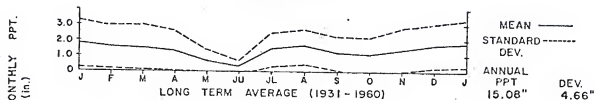


* MISSING OR UNPROPORTIONABLE DATA

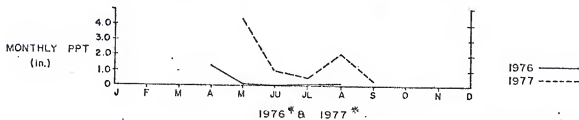
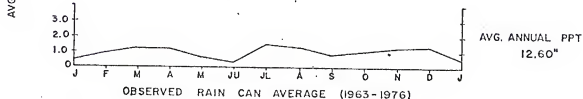
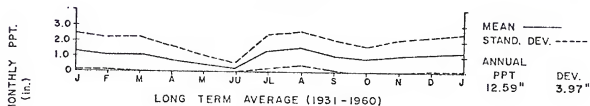
MATHEWS CANYON HYDRO STUDY

LATITUDE- 37° 33'
LONGITUDE- 114° 07'

CAN #3
ELEV.- 5850'



CAN #9
ELEV.- 5600'

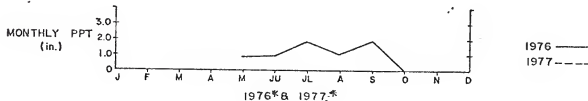
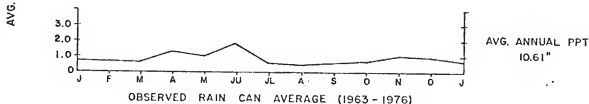
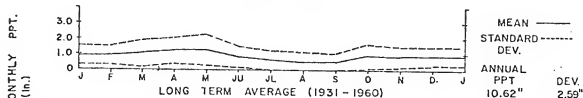


* DATA RECORD INCOMPLETE

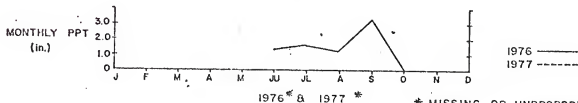
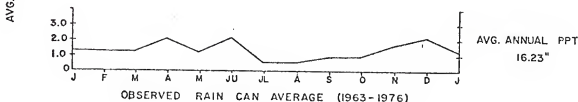
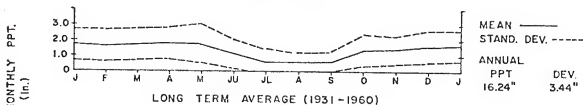
MILL CREEK HYDRO STUDY

LATITUDE- 40° 28'
LONGITUDE- 116° 53'

CAN # 1
ELEV.- 5040'



CAN # 6
ELEV.- 6360'

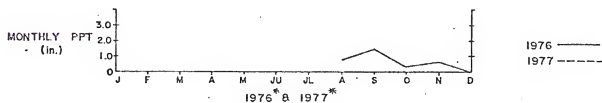
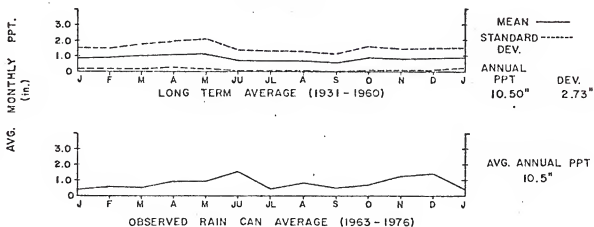


* MISSING OR UNPROPORTIONABLE
DATA

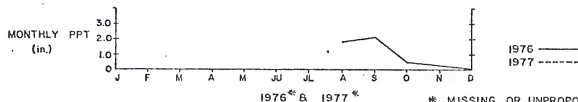
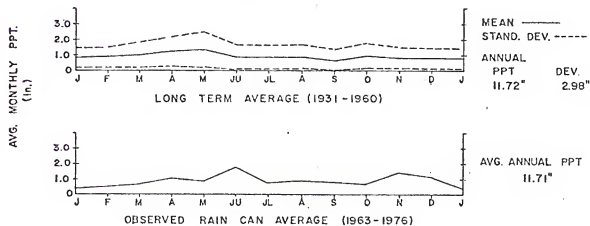
COILS CREEK HYDRO STUDY

LATITUDE - 39° 45'
LONGITUDE - 116° 40'

CAN # 5
ELEV. - 6560'



CAN # 17
ELEV. - 7020'



* MISSING OR UNPROPORTIONABLE DATA

Variability of Precipitation

Monthly and annual precipitation variability depends upon the total precipitation and frequency of storms, combining all storm types. Therefore, variabilities have been calculated using long-term monthly and annual mean precipitation and latitude factors, without regard to storm types. The following can be concluded:

1) Since precipitation is more reliable as frequency of storms increases, variability decreases as frequency of daily precipitation increases. Variability decreases as latitude and mean monthly precipitation increase.

2) In the northern Great Basin, the monthly variability is lowest in the winter and highest in the summer. In the southern Great Basin, variability is lowest in the winter and generally highest in May, June, and October.

3) The annual variability is highest in the desert basins (especially the southern ones) and lowest in the northern mountains.

The monthly and annual variabilities for the selected cans are as follows:

MONTHLY-VARIABILITY COEFFICIENT

CAN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
ROCK SPRINGS CAN #5	.56	.57	.55	.50	.57	.60	.93	.92	.88	.65	.56	.56	.18
ROCK SPRINGS CAN #11	.67	.69	.74	.63	.67	.70	1.05	1.00	1.04	.74	.73	.68	.22
CRANE SPRINGS CAN #1	.70	.70	.72	.72	.77	.84	.94	.94	.98	.82	.77	.70	.23
CRANE SPRINGS CAN #11	.64	.67	.67	.65	.74	.82	.98	.95	.99	.78	.78	.67	.23

MONTHLY VARIABILITY COEFFICIENT

CAN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
COW CREEK CAN #2	.73	.75	.93	.93	.82	.82	1.00	1.10	1.17	.94	.87	.71	.28
COW CREEK CAN #16	.68	.71	.99	.82	.74	.74	.94	1.02	1.05	.82	.75	.67	.24
CROWLEY CREEK CAN #2	.58	.61	.72	.75	.68	.70	1.10	1.30	1.25	.77	.67	.57	.23
CROWLEY CREEK CAN #10	.61	.65	.80	.66	.58	.58	.83	1.02	1.00	.68	.60	.58	.16
EASTGATE CAN #15	.75	.75	.77	.75	.83	.90	.87	.85	.93	.87	.80	.74	.26
EASTGATE CAN #22	.80	.79	.89	.89	.92	1.00	1.10	1.10	1.05	.98	.95	.79	.31
CHURCHILL CAN #2	.80	.83	1.00	1.07	1.08	1.10	.98	.95	1.08	1.10	1.02	.80	.32
CHURCHILL CAN #10	.74	.76	.82	.90	.89	.91	.84	.88	.93	.94	.81	.74	.27
STEPTOE CAN #6	.79	.79	.85	.82	.90	.93	.80	.70	.87	.91	.89	.79	.28
STEPTOE CAN #10	.78	.79	.82	.80	.89	.96	.73	.63	.83	.90	.87	.79	.27
DUCKWATER CAN #16	.78	.78	.83	.80	.89	.98	.80	.70	.87	.90	.88	.78	.28
DUCKWATER CAN #24	.83	.81	.90	.86	.93	1.20	.91	.85	.94	.97	.97	.81	.30

MONTHLY VARIABILITY COEFFICIENT

CAN	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MATHEWS CANYON CAN #3	.86	.87	.96	.98	1.08	1.19	.76	.68	.88	.99	.97	.86	.30
MATHEWS CANYON CAN #9	.88	.89	1.01	1.05	1.12	1.25	.80	.71	.91	1.04	1.02	.89	.32
PINE CANYON CAN #3	.85	.86	.96	1.00	1.07	1.18	.70	.62	.81	.99	.97	.94	.29
PINE CANYON CAN #8	.87	.89	1.00	1.05	1.11	1.25	.75	.64	.89	1.03	1.03	.88	.31
MILL CREEK CAN #1	.69	.69	.83	.70	.75	.82	.98	1.00	1.00	.80	.76	.70	.24
MILL CREEK CAN #6	.60	.61	.59	.58	.69	.77	1.14	.98	.97	.73	.64	.61	.21
COILS CREEK CAN #5	.74	.74	.79	.76	.82	.89	.91	.91	.95	.87	.82	.74	.26
COILS CREEK CAN #17	.74	.74	.77	.74	.80	.89	.85	.85	.92	.85	.80	.75	.25

Orographic Lifting

Orographic lifting is a precipitation triggering mechanism occurring when air, moving in from a non-parallel direction, is forced to ascend a topographic barrier, such as a mountain range. Cooler temperatures at higher elevations decrease the water-holding capacity of the air, resulting in increased condensation if sufficient moisture is present.

Precipitation/elevation relationships vary as a result of differences in: 1) local and regional slope, 2) orientation of the sloping surface, 3) degree of local exposure, and 4) moisture content of incoming air masses. The precipitation/elevation relationship can be evaluated by plotting average annual precipitation against elevation at different locations and deriving a line which best describes the trend of the data. One precipitation/elevation graph has been plotted for each of the watersheds.

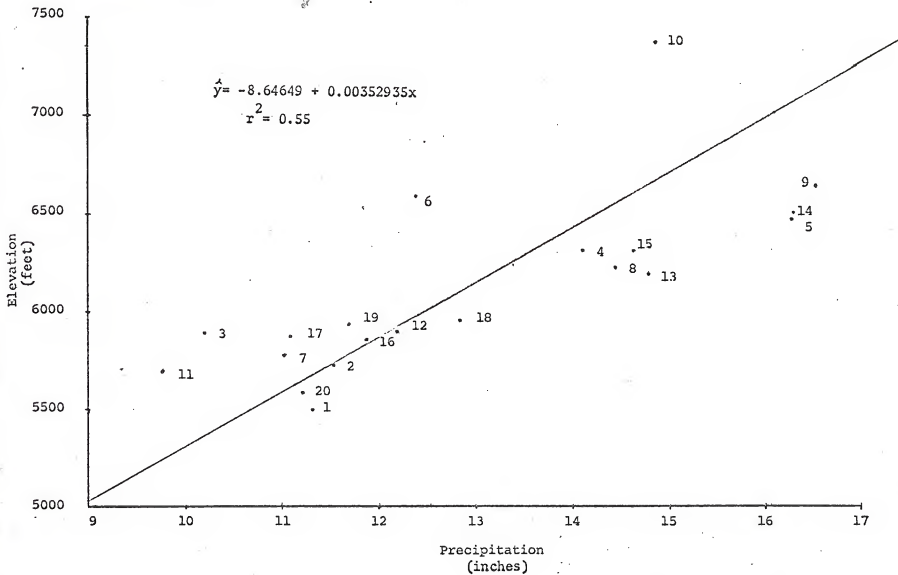
A best fitting line was computed for each watershed, using regression-correlation analysis. The correlation of data with the line is evaluated by a coefficient of determination, r^2 , a measure of the percent of variance in y explained by the regression with x . Values for r^2 can range from a minimum of zero, for no correlation at all, to a maximum of one, for perfect correlation. Equations for the best fitting lines and values for the coefficient of determination are contained in tabular form in the Summary. The axes for the following graphs have been reversed for easier reading.

Values for " r^2 " can range from a minimum of zero, for no correlation at all, to a maximum of one, for a perfect correlation. Equations for the best fitting lines and values for coefficient of determination are contained in tabular form in the Summary. The axes for the following graphs have been reversed for easier reading.

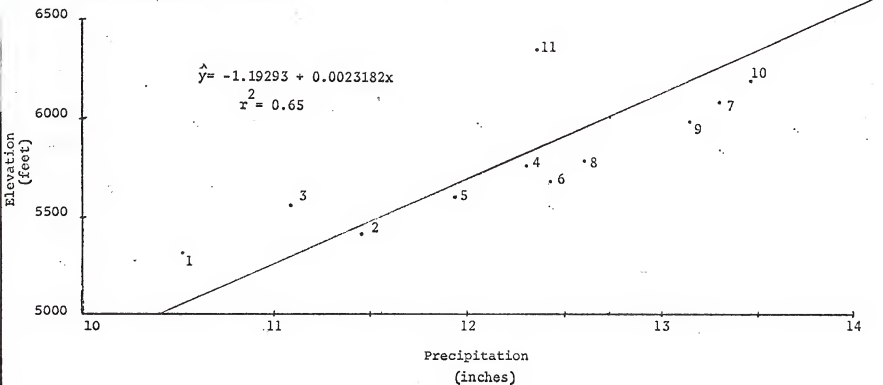
The slope of the best fitting line gives the average increase in elevation necessary to produce an increase in precipitation. Average increases in precipitation per 1000 foot increase in elevation for all watersheds may be found in the Summary.

Approximate values for increases in precipitation, relative to elevation, have potential use in estimating precipitation at higher elevations in areas where only valley rain can data is available. Because precipitation/elevation relationships may vary widely between different locations (see table and map in Orographic Lifting Summary), the area for which an estimate is being made should be compared to the gaged watershed being used in the estimate for similarities in the four above-mentioned factors.

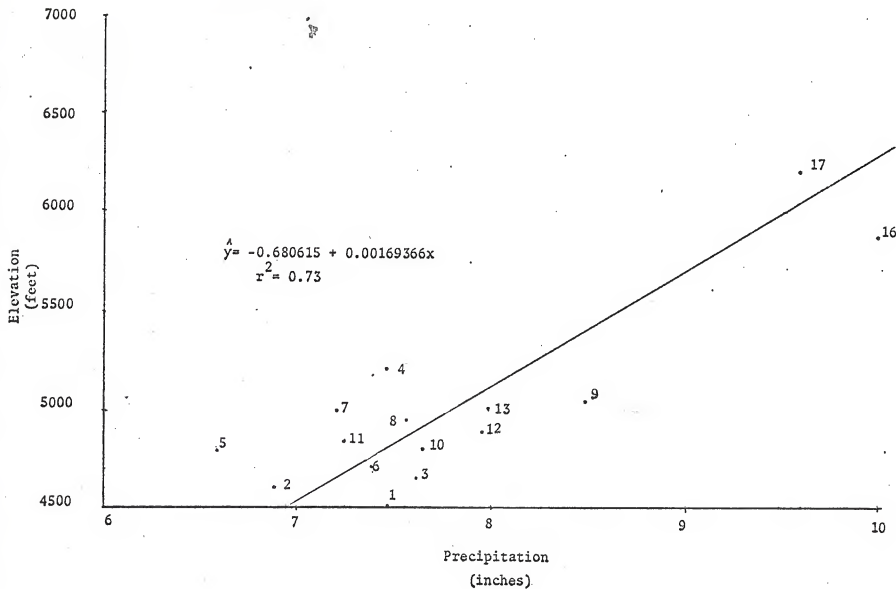
Rock Springs (1964-1976)



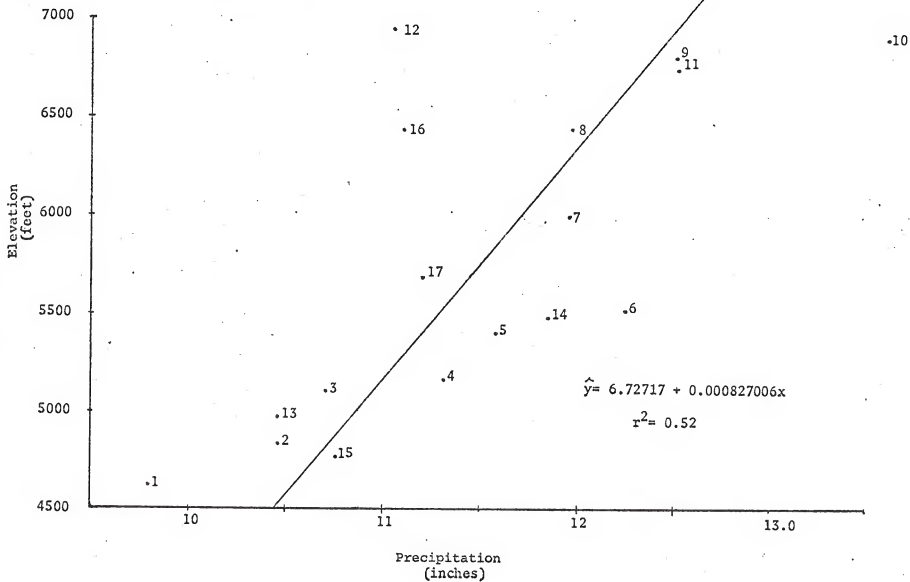
Crane Springs (1964-1976)



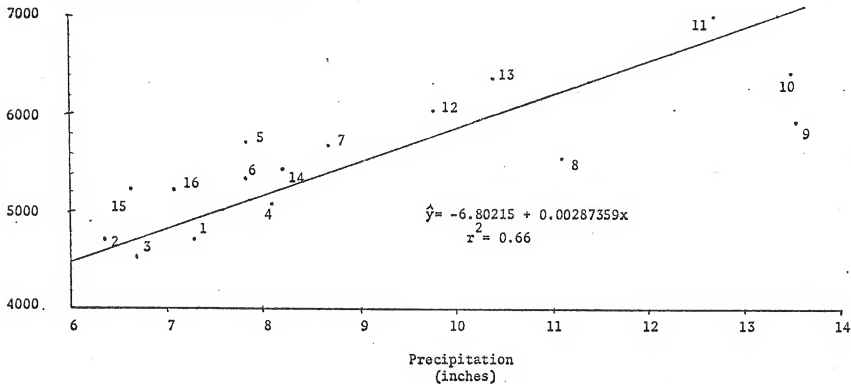
Cow Creek (1964-1976)

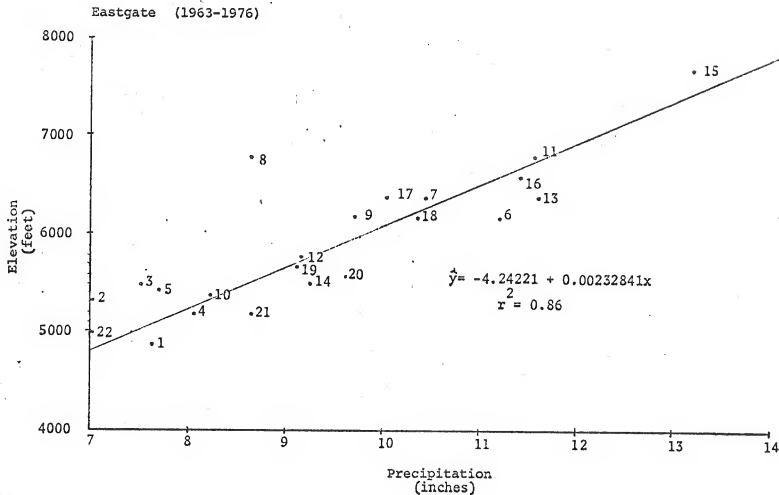


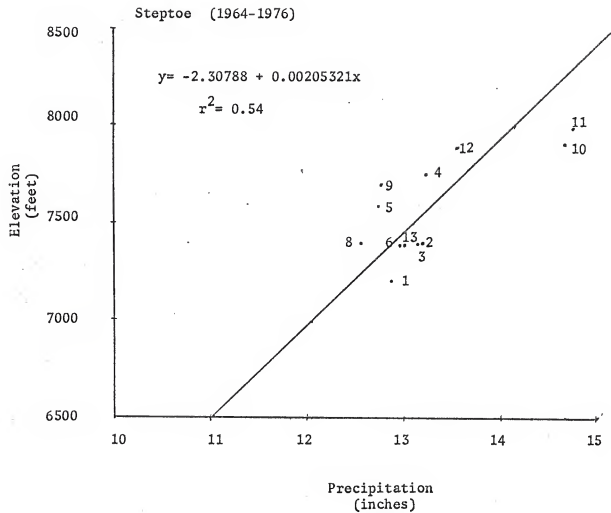
Crowley Creek (1962-1976)



Churchill Canyon (1963-1976)

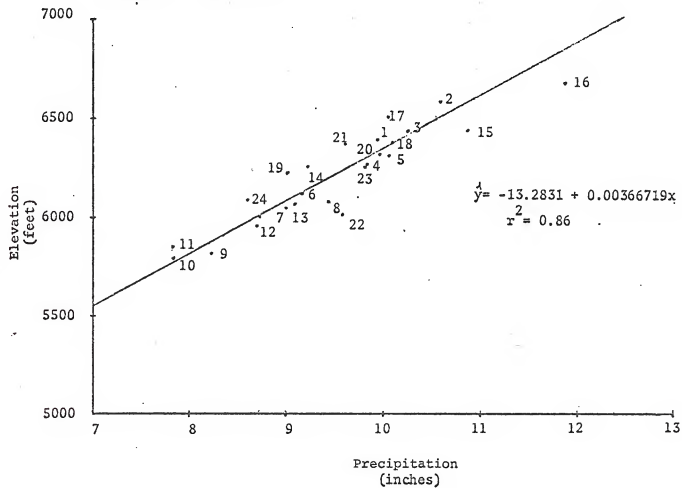




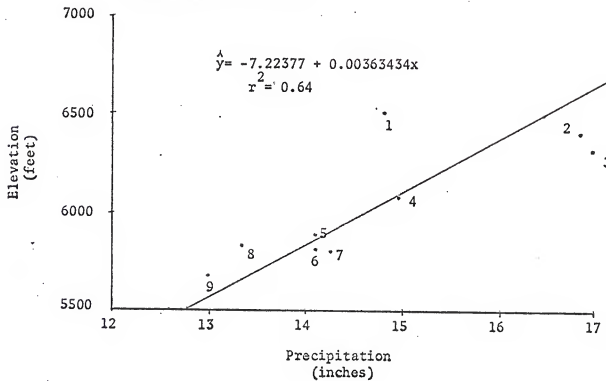


Note: Can #7 was deleted because of erroneous data.

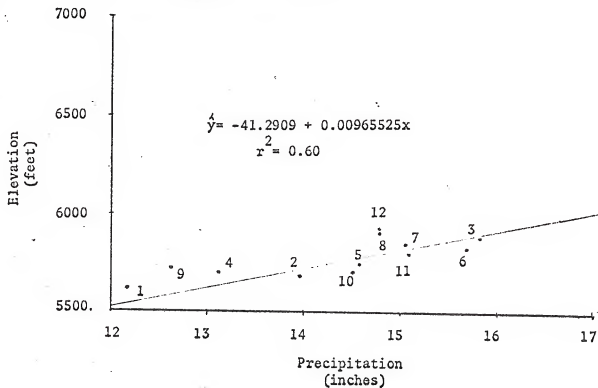
Duckwater (1963-1976)



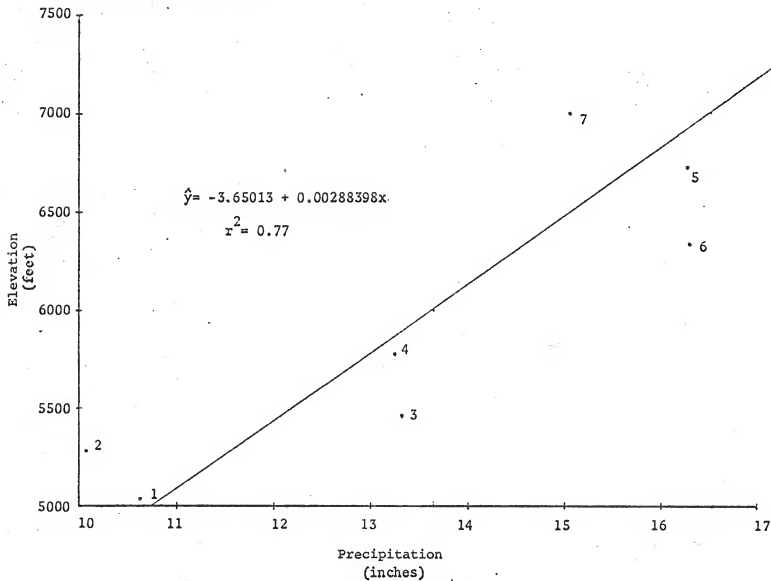
Pine Canyon (1963-1976)

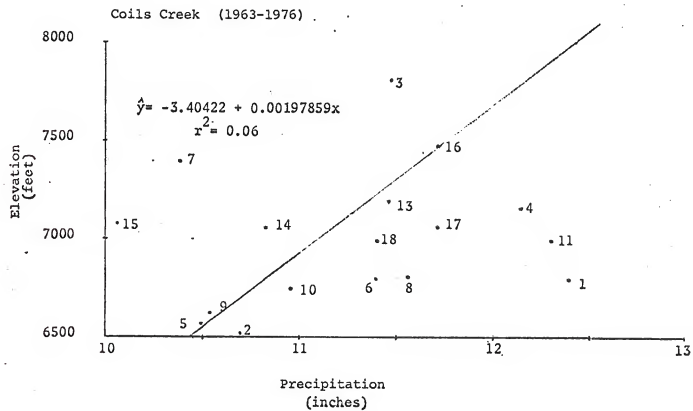


Mathews Canyon (1962-1976)



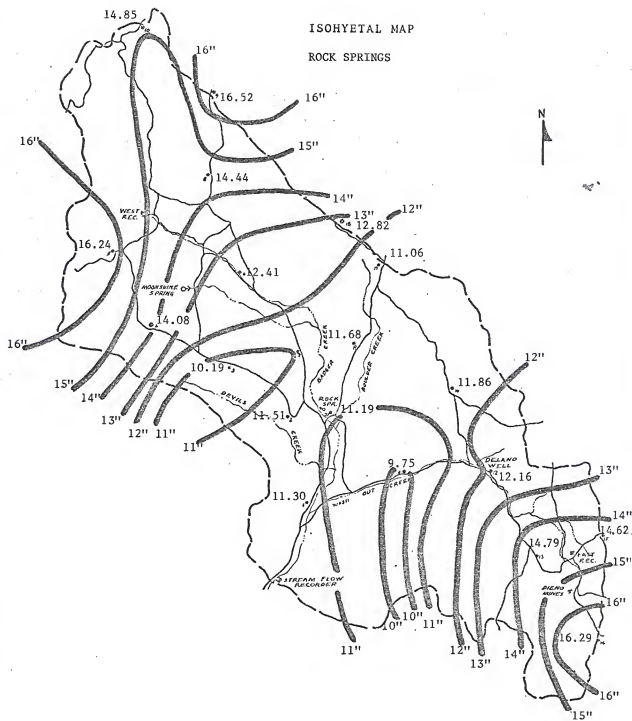
Mill Creek (1963-1976)



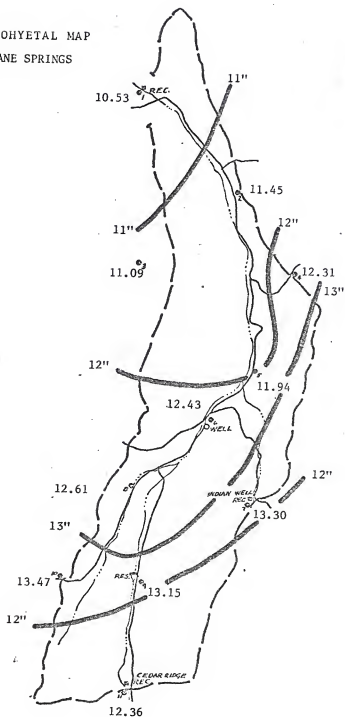


Isohyetal Maps

The following isohyetal maps depict the areal distributions of mean annual precipitation within the watersheds. Isolines, lines along which precipitation values remain constant, have been drawn using the observed mean annual rain can values (see appendix section: Observed Means "total" columns). The position for each isoline has been determined by interpolating between the appropriate rain can precipitation values. The mean annual values used in constructing the isolines reflect exposure and local relief factors. The isohyetal maps, though generalized, are useful in predicting watershed response to storm events.



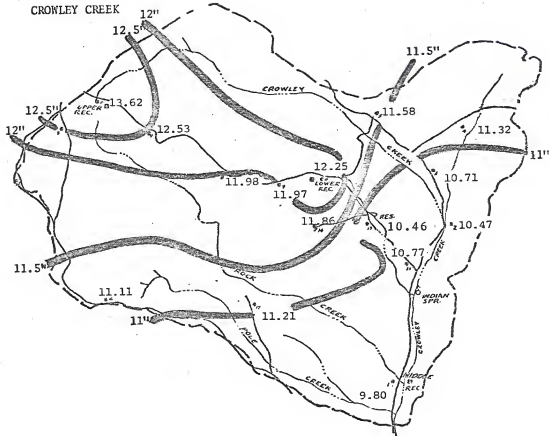
ISOHYETAL MAP
CRANE SPRINGS

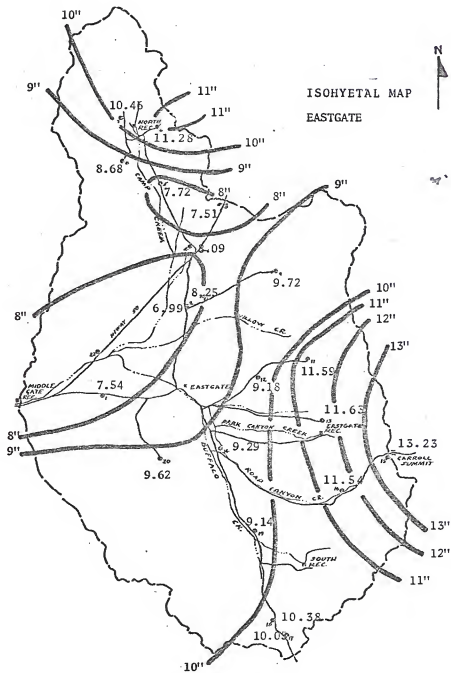


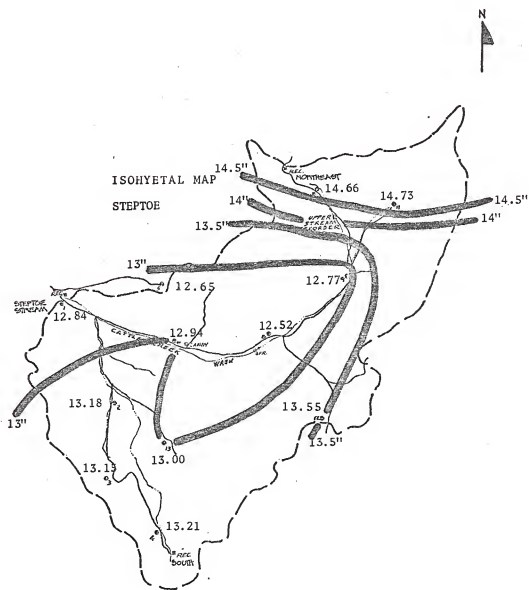


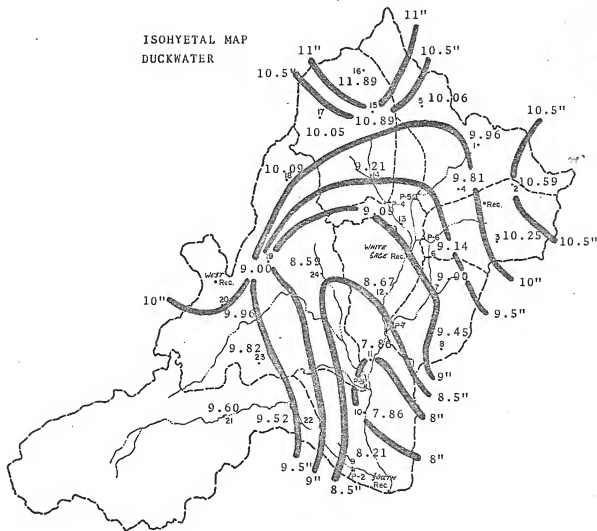
ISOHYETAL MAP

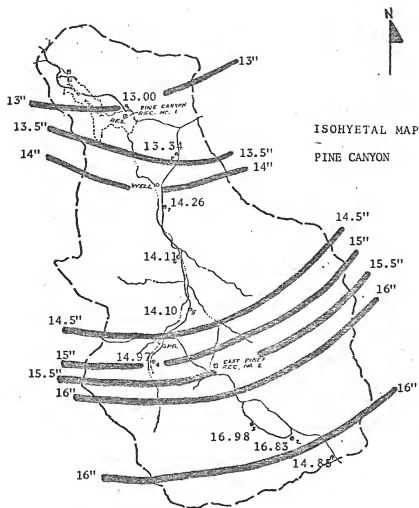
CROWLEY CREEK





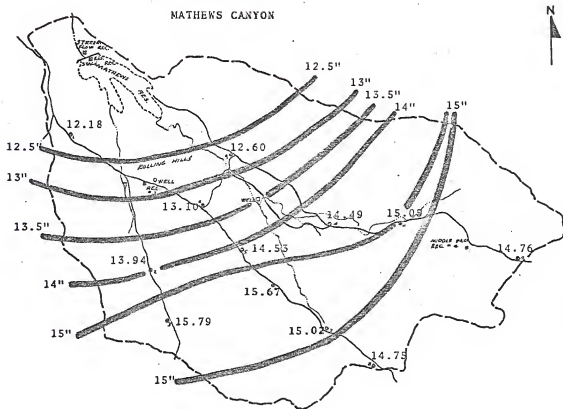


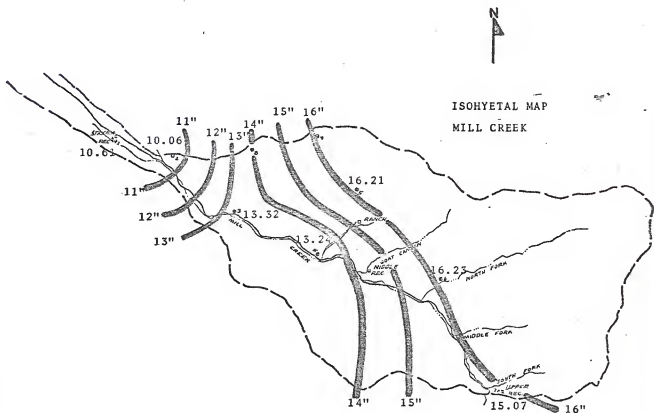




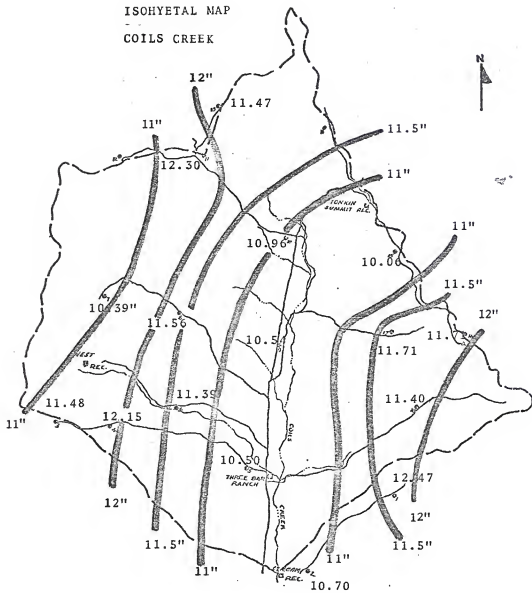
ISOHYETAL MAP

MATHEWS CANYON





ISOHYETAL MAP
COILS CREEK

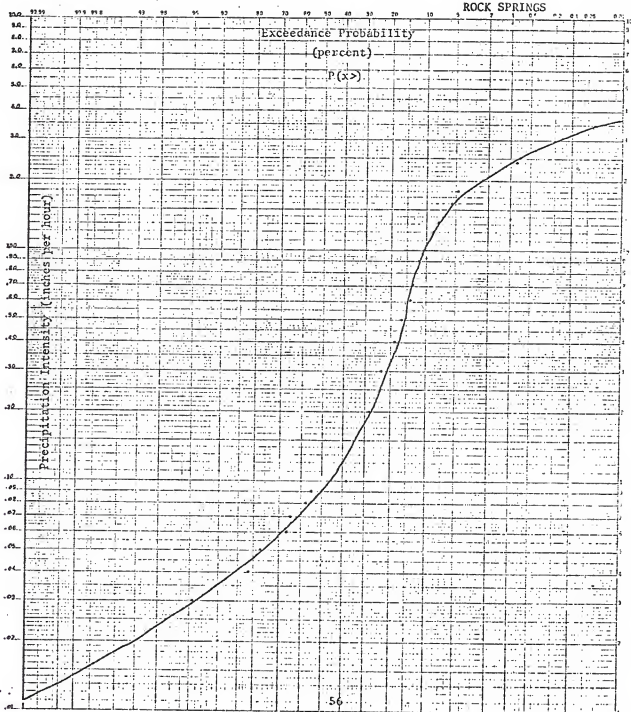


Exceedance Probabilities

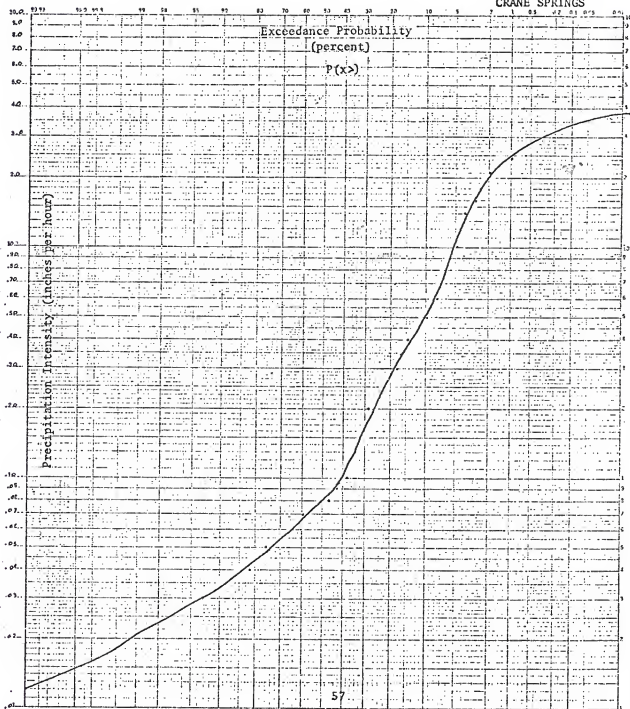
Data from the automatic precipitation recorders has been used to compute rainfall intensities (in/hr) for all storms on record with total precipitation greater than or equal to .5 inches. The intensities were rounded off and put into groups for which the number of members could be totaled. The number of occurrences in each intensity group was weighed against the total number of storms greater than or equal to .5 inches, and the probability of a given storm exceeding each intensity was computed.

One graph with probability vs. intensity was plotted for each watershed area and a best fitting curve drawn. The probability of a given intensity being equalled or exceeded may be read directly from the exceedance probability axis of the graph. Exceedance probabilities are valuable in evaluating an area for flood hazard and erosion potentials.

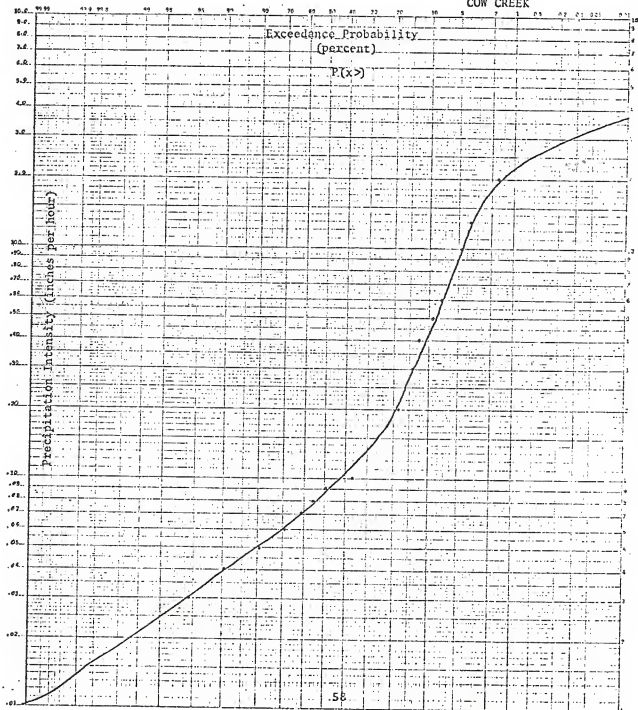
ROCK SPRINGS

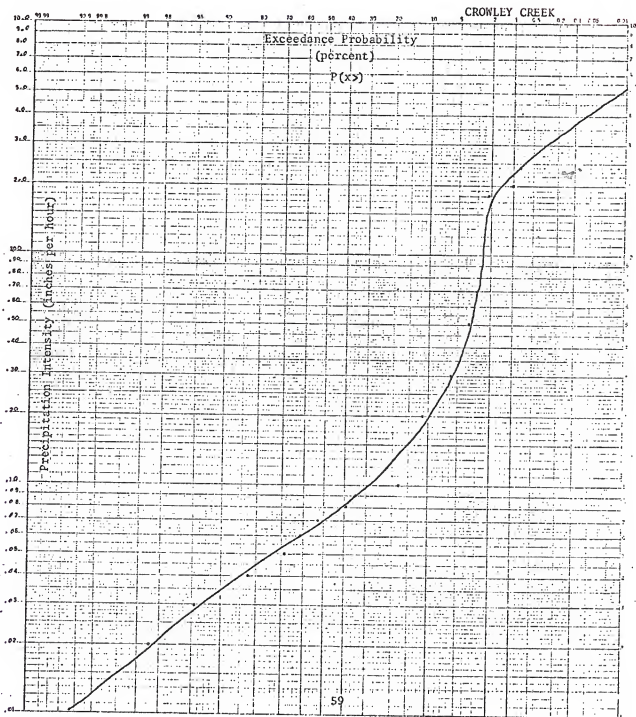


CRANE SPRINGS

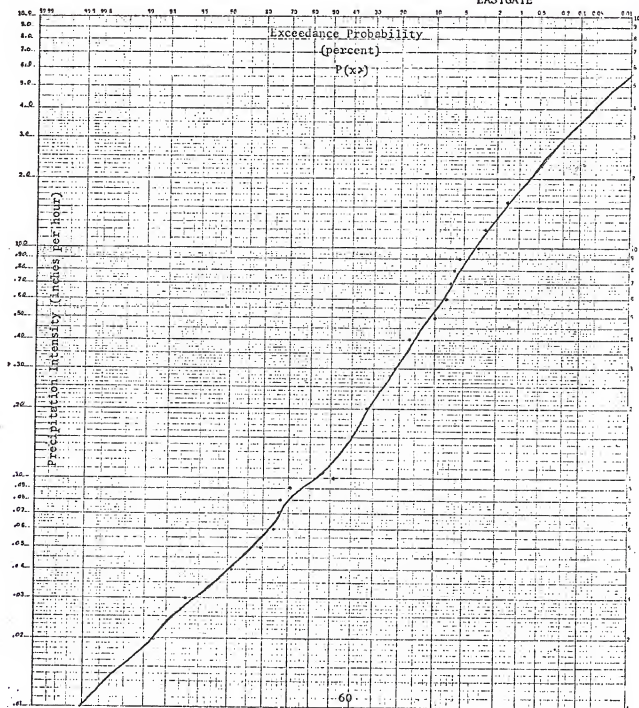


COW CREEK

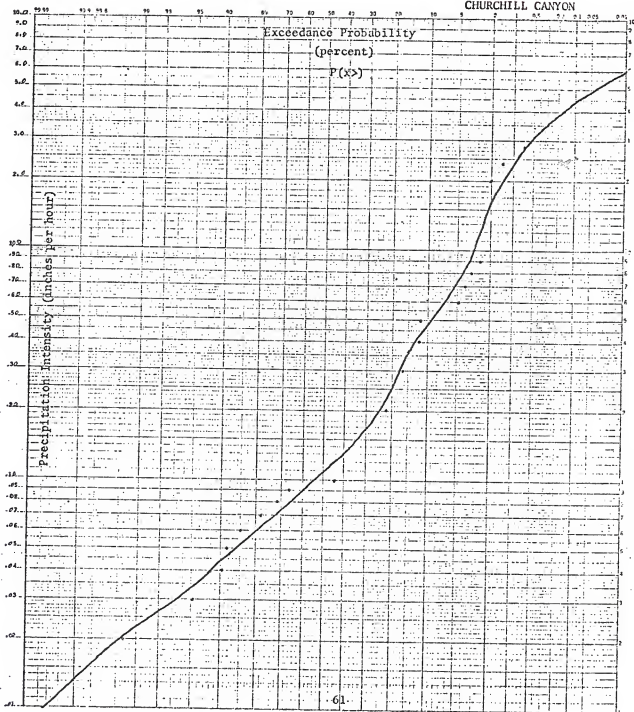




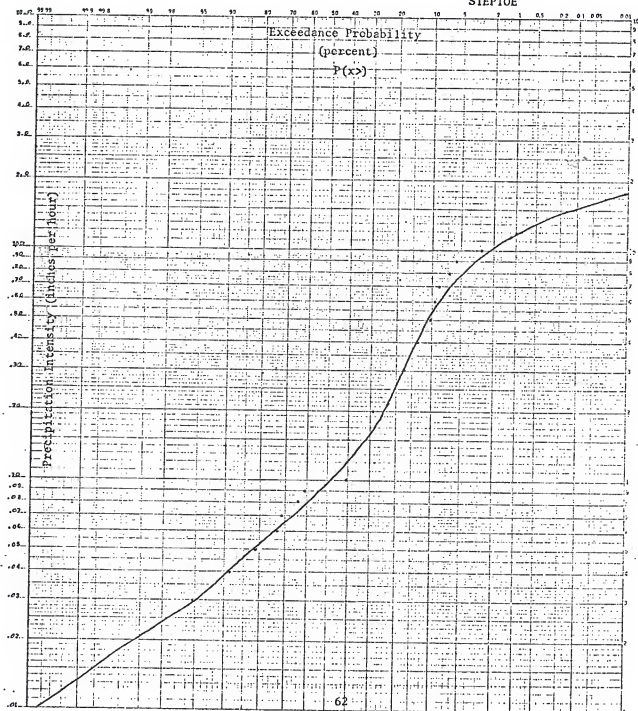
EASTGATE



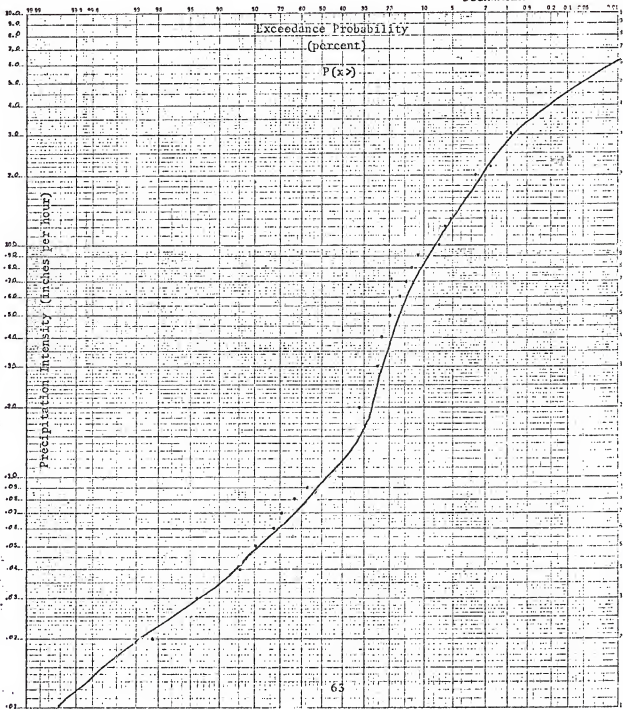
CHURCHILL CANYON



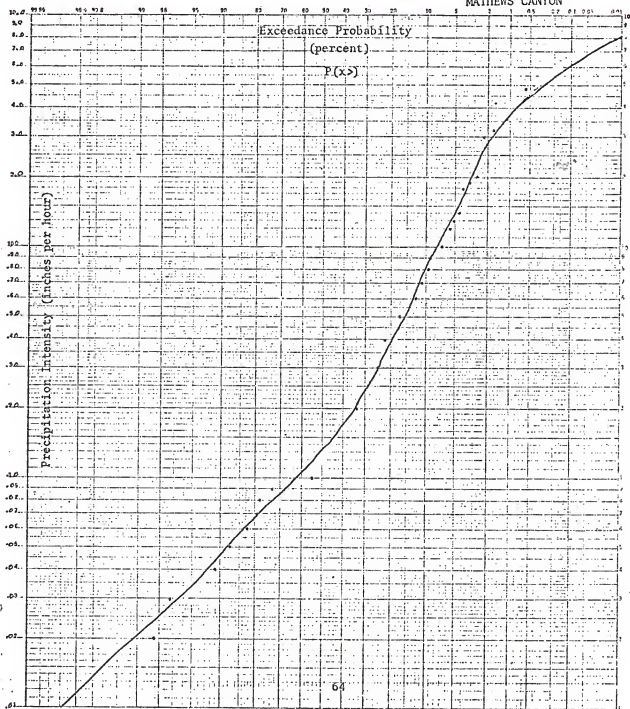
STEP10E



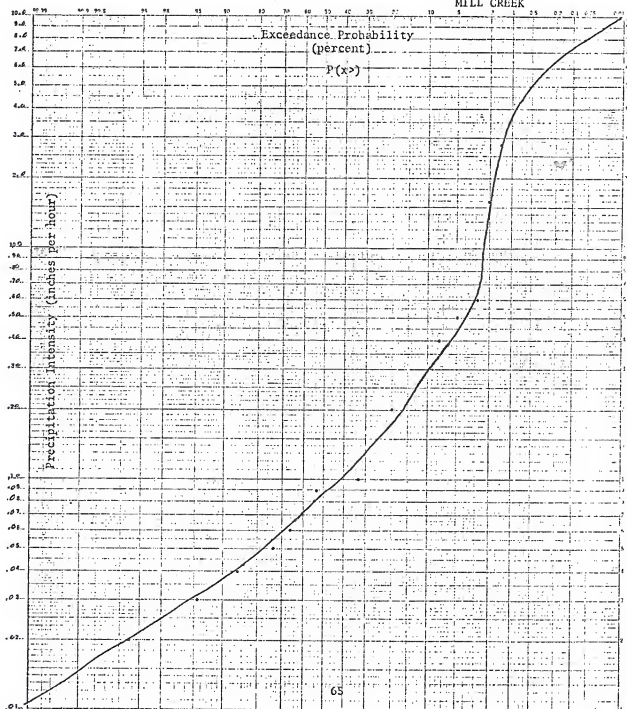
DUCKWATER



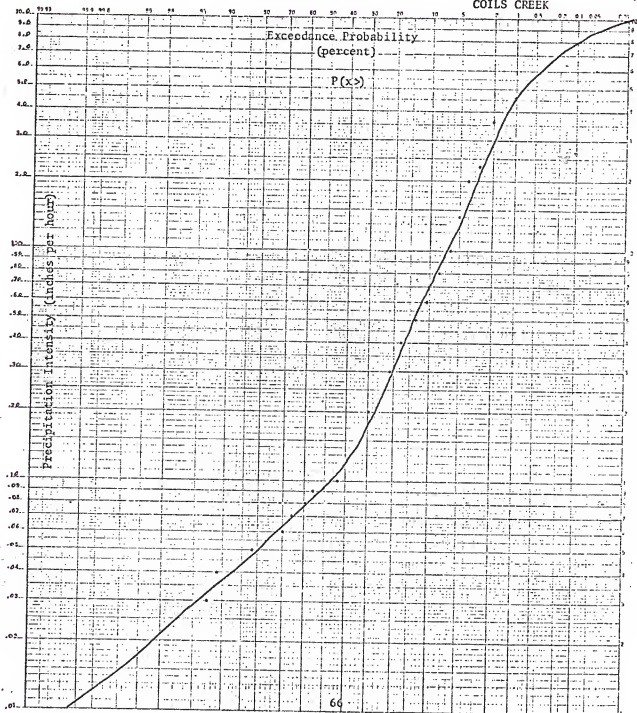
PINE CANYON AND
MATHES CANYON



MILL CREEK



COILS CREEK



Recurrence Interval For One-Hour Duration Storms

The following table depicts the expected annual maximum one-hour duration precipitation intensities, in inches, by hydro area for various recurrence intervals. The recurrence interval is determined by taking the reciprocal of the exceedance probability in decimal form.

HYDRO AREA	RECURRENCE INTERVAL (YEARS)					
	2	5	10	25	50	100
Rock Springs	.090	0.33	1.05	1.78	2.10	2.40
Crane Springs	.080	0.28	0.52	1.30	2.00	2.50
Cow Creek	.086	0.19	0.43	1.15	1.80	2.20
Crowley Creek	.070	0.13	0.20	0.43	1.70	2.25
Eastgate	.115	0.32	0.54	0.96	1.34	1.80
Churchill Canyon	.110	0.25	0.48	0.85	1.60	2.40
Duckwater	.094	0.38	0.84	1.50	2.10	2.80
Steptoe	.097	0.26	0.54	0.85	1.03	1.18
Pine & Mathews Canyons	.133	0.39	0.82	1.70	2.80	3.75
Coils Creek	.094	0.31	0.70	1.60	2.90	4.60
Mill Creek	.087	0.18	0.30	0.50	1.50	3.75

Note: Recurrence Interval is also known as "Return Period."

Frequency of Precipitation

The effectiveness of precipitation for vegetation growth and agriculture depends heavily upon the frequency of precipitation days. If the annual precipitation occurs mostly in a few heavy storms, much of the water runs off and is lost by evaporation. If long periods occur between storms, the soils dry out, and vegetation is limited to drought-tolerant species. If, however, annual precipitation occurs as many light storms, most of the moisture is adsorbed by the soils and made available to vegetative cover. High frequency of precipitation ensures a recharge to the groundwater system.

Frequency of precipitation is highest where triggering mechanisms operate most often. Since cyclonic activity shows a poleward increase in frequency throughout the Great Basin, the number of precipitation days correspondingly increases with latitude in the cyclonic seasons. In summer, this factor is less of an influence due to convective rainfall, which increases southeastward. There are also areas of high precipitation frequency associated with orographic lifting effects (increase of precipitation with elevation on the windward slopes of mountain ranges). Also in association with orographic lifting, rain shadows (areas of low frequency precipitation) occur at lower elevations on the lee sides of ranges and in basin areas near the leeward slopes. Therefore, the frequency of precipitation is a function of both latitude and local relief (elevation and exposure).

Since local relief is difficult to quantify, the closely-related numerical parameter of long-term mean precipitation has instead been used in association with latitude to derive the frequency of daily precipitation.

Besides vegetation growth, other conditions such as rill erosion and sediment transport in stream channels depend upon precipitation frequency. Therefore, more than merely the number of days with measurable precipitation (.01 inch or more) must be considered. In this analysis five intensities of daily precipitation have been considered: 24-hour amounts equal to or greater than .01, .10, .25, .50, and 1.00 inch.

The following tables show the predictable number of days per month that precipitation can be expected to fall within a 24-hour period at given intensities. These numbers of days are partially based upon the calculated long-term monthly and annual precipitation in inches, shown for reference in the first row of each table.

FREQUENCY OF 24 - HOUR PRECIPITATION AT ROCK SPRINGS - CAN #11
LATITUDE 41°49'N, ELEVATION 5700 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.70	.67	.72	.98	1.27	1.03	.70	.74	.69	.81	.73	.70	9.74
DAYS ≥ .01	6.00	6.00	6.40	6.20	9.20	6.70	5.00	5.20	6.80	5.10	4.90	5.00	72.50
DAYS ≥ .10	2.70	3.00	3.00	3.50	3.80	2.40	2.40	2.80	3.10	3.00	2.90	3.00	35.60
DAYS ≥ .25	1.00	1.00	1.30	1.70	2.00	.90	1.20	1.60	1.70	1.50	.80	1.20	15.90
DAYS ≥ .50	.45	.25	.20	.60	.80	.40	.80	.70	.50	.50	.70	.30	6.20
DAYS ≥ 1.00	.10	.09	.10	.20	.15	.20	.22	.15	.17	.17	.12	.10	1.77

FREQUENCY OF 24 - HOUR PRECIPITATION AT ROCK SPRINGS - CAN #5
LATITUDE 41°49'N, ELEVATION 6480 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.34	1.26	1.32	1.68	2.13	1.72	.89	.91	.97	1.38	1.30	1.32	16.22
DAYS > .01	8.80	9.20	9.10	8.50	13.00	8.70	6.20	7.50	9.10	7.50	6.50	8.00	102.10
DAYS > .10	4.50	5.00	5.00	5.50	7.50	5.60	3.10	3.40	4.20	4.20	3.90	5.00	56.90
DAYS > .25	2.30	2.00	2.20	2.90	3.80	3.10	1.50	1.80	2.20	2.60	2.70	1.80	28.90
DAYS > .50	.70	.40	.40	1.30	1.50	1.80	1.10	.80	.90	1.40	1.30	.70	12.30
DAYS ≥ 1.00	.25	.27	.20	.30	.33	.35	.28	.18	.26	.33	.28	.20	3.23

FREQUENCY OF 24 - HOUR PRECIPITATION AT CRANE SPRINGS - CAN #1
LATITUDE 40°32'N, ELEVATION 5320 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.92	.91	1.01	1.12	1.14	.75	.73	.74	.62	.86	.83	.89	10.52
DAYS ≥ .01	6.60	6.20	7.80	6.30	8.20	5.00	4.60	5.40	5.00	5.40	5.00	4.90	70.40
DAYS ≥ .10	3.20	3.60	3.80	3.60	4.00	2.70	2.20	2.50	2.80	2.70	2.80	3.30	37.20
DAYS ≥ .25	1.50	1.70	2.10	1.80	1.80	1.50	1.10	1.50	1.40	1.70	2.00	1.50	18.90
DAYS ≥ .50	.48	.60	.50	.80	.75	.75	.75	.60	.47	.80	.80	.60	7.90
DAYS ≥ 1.00	.25	.26	.35	.25	.20	.40	.25	.35	.40	.26	.20	.20	3.37

FREQUENCY OF 24 - HOUR PRECIPITATION AT CRANE SPRINGS - CAN #11
LATITUDE 40°32'N, ELEVATION 6350 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.20	1.16	1.25	1.32	1.32	.86	.71	.70	.63	1.02	1.02	1.16	12.35
DAYS ≥ .01	7.10	7.80	8.20	7.10	8.80	5.80	4.70	4.60	5.00	6.00	5.40	5.80	76.30
DAYS ≥ .10	4.00	4.40	4.40	4.30	4.40	3.00	2.30	2.40	2.70	3.10	3.20	3.70	41.90
DAYS ≥ .25	2.00	2.20	2.30	2.30	2.20	1.60	1.10	1.50	1.50	2.10	2.30	2.00	23.10
DAYS ≥ .50	.70	.75	.70	1.00	.90	.80	.70	.50	.45	1.00	1.00	.75	9.25
DAYS ≥ 1.00	.29	.33	.29	.22	.25	.20	.25	.13	.17	.29	.21	.25	2.88

FREQUENCY OF 24 - HOUR PRECIPITATION AT ELKO
LATITUDE 40°50'N, ELEVATION 5050 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.16	.89	.83	.82	.95	.71	.40	.30	.34	.75	.83	1.01	9.04
DAYS ≥ .01	7.90	7.90	7.20	6.00	8.20	5.70	2.90	3.30	4.00	5.00	5.00	6.90	70.00
DAYS ≥ .10	4.10	3.80	3.60	2.90	3.80	2.90	1.10	1.50	2.00	2.50	2.80	3.90	34.90
DAYS ≥ .25	1.70	1.40	1.50	1.40	1.30	1.40	.60	.70	.90	1.30	1.70	1.60	15.50
DAYS ≥ .50	.60	.50	.40	.50	.60	.60	.30	.30	.30	.60	.80	.50	6.00
DAYS ≥ 1.00	.20	.10	.10	.10	.20	.20	.03	.03	.05	.10	.20	.20	1.51

FREQUENCY OF 24 - HOUR PRECIPITATION AT COW CREEK - CAN #2
 LATITUDE 40°43'N, ELEVATION 4600 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.68	.54	.43	.44	.78	.76	.58	.47	.39	.50	.58	.74	6.89
DAYS $\geq$.01	5.80	4.40	5.00	3.20	7.00	5.20	4.00	3.60	3.60	3.90	4.20	4.80	54.70
DAYS $\geq$.10	2.70	2.25	1.90	1.30	3.25	2.80	1.90	1.80	1.90	1.90	2.25	3.15	27.10
DAYS $\geq$.25	1.00	.75	.75	.35	1.00	1.50	.87	1.00	.87	.75	1.25	1.25	11.34
DAYS $\geq$.50	.30	.13	.14	.20	.33	.70	.50	.37	.25	.33	.30	.30	3.85
DAYS $\geq$ 1.00	.13	.08	.03	.05	.08	.17	.20	.07	.07	.10	.06	.13	1.17

FREQUENCY OF 24 - HOUR PRECIPITATION AT COW CREEK - CAN #16
 LATITUDE 40°43'N, ELEVATION 5900 FT.

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PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.92	.72	.57	.66	1.28	1.26	.81	.59	.54	.77	.85	1.04	10.01
DAYS $\geq$.01	6.70	5.00	5.20	5.00	8.70	7.00	5.40	4.10	4.75	4.90	5.00	5.50	67.25
DAYS $\geq$.10	3.40	2.80	2.30	2.00	4.50	4.15	2.60	2.20	2.50	2.70	2.90	3.80	35.85
DAYS $\geq$.25	1.40	1.25	.80	1.00	1.90	2.40	1.25	1.25	1.25	1.45	1.90	1.75	17.60
DAYS $\geq$.50	.43	.20	.25	.33	.85	1.35	.85	.40	.40	.65	.85	.60	7.16
DAYS $\geq$ 1.00	.17	.17	.06	.08	.22	.33	.25	.10	.13	.20	.17	.20	2.08

FREQUENCY OF 24 - HOUR PRECIPITATION AT CROWLEY CREEK - CAN #2
LATITUDE 41°37'N, ELEVATION 4840 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.24	.99	.80	.72	1.15	1.08	.61	.42	.44	.78	.95	1.30	10.48
DAYS > .01	8.40	7.70	7.00	5.80	9.90	6.90	4.70	3.50	4.00	5.25	5.60	8.00	76.75
DAYS > .10	4.50	4.00	3.40	2.20	4.40	3.90	2.20	1.85	2.00	2.90	3.25	4.90	39.50
DAYS > .25	1.85	1.40	1.30	1.20	1.60	2.15	1.05	.88	1.00	1.40	2.15	2.00	17.98
DAYS > .50	.60	.22	.22	.75	.75	.85	.70	.33	.25	.65	.90	.60	6.82
DAYS ≥ 1.00	.20	.20	.11	.07	.17	.20	.21	.05	.07	.13	.21	.20	1.82

FREQUENCY OF 24 - HOUR PRECIPITATION AT CROWLEY CREEK - CAN #10
LATITUDE 41°37'N, ELEVATION 6900 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.01	.77	.58	.94	2.10	2.14	1.14	.71	.73	1.16	1.17	1.25	13.70
DAYS > .01	7.00	6.20	6.00	6.00	12.60	9.40	7.60	5.50	7.00	6.75	6.00	7.80	87.85
DAYS > .10	3.80	3.35	2.70	3.20	7.25	6.80	3.65	2.70	3.40	3.65	3.70	4.80	49.00
DAYS > .25	1.50	1.10	.90	1.50	3.50	3.90	1.80	1.40	1.75	2.20	2.40	1.80	23.75
DAYS > .50	.43	.33	.11	.60	1.60	2.40	1.40	.65	.50	1.00	1.00	.60	10.62
DAYS ≥ 1.00	.17	.13	.03	.10	.33	.48	.33	.13	.15	.40	.25	.20	2.70

FREQUENCY OF 24 - HOUR PRECIPITATION AT WINNEMUCCA
LATITUDE 40°54'N, ELEVATION 4299 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.96	.81	.71	.73	.91	1.00	.23	.25	.28	.65	.94	.93	8.40
DAYS > .01	7.00	6.50	6.50	5.30	7.80	6.40	2.00	2.50	3.00	4.60	5.50	5.70	62.80
DAYS > .10	3.50	3.20	3.00	2.50	3.80	3.70	.70	.90	1.50	2.40	3.20	3.70	32.10
DAYS > .25	1.50	1.50	1.20	1.20	1.30	2.00	.40	.40	.70	1.10	2.20	1.60	15.10
DAYS > .50	.45	.40	.30	.50	.60	.95	.20	.15	.15	.50	.90	.50	5.60
DAYS ≥ 1.00	.20	.20	.10	.10	.15	.25	.02	.02	.03	.15	.25	.20	1.67

FREQUENCY OF 24 - HOUR PRECIPITATION AT EASTGATE - CAN #22
 LATITUDE 39°19'N, ELEVATION 5000 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.68	.67	.72	.77	.77	.50	.37	.35	.33	.59	.59	.66	7.00
DAYS ≥ .01	5.00	4.80	5.20	5.00	6.50	3.40	2.50	2.50	2.90	4.25	4.20	3.60	49.85
DAYS ≥ .10	2.50	2.60	2.60	2.50	3.20	1.75	1.30	1.35	1.50	2.20	1.75	2.25	25.50
DAYS ≥ .25	1.25	1.50	1.40	1.00	1.35	.80	.60	.75	.75	1.20	1.35	1.40	13.35
DAYS ≥ .50	.35	.50	.45	.45	.45	.40	.35	.25	.20	.55	.40	.50	4.85
DAYS ≥ 1.00	.20	.18	.15	.10	.15	.09	.12	.06	.08	.22	.08	.18	1.61

FREQUENCY OF 24 - HOUR PRECIPITATION AT EASTGATE - CAN #15
 LATITUDE 39°19'N, ELEVATION 7700 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.25	1.21	1.31	1.38	1.38	.90	.86	.88	.73	1.06	1.07	1.21	13.24
DAYS ≥ .01	6.80	7.50	7.80	6.75	8.20	5.30	4.80	5.75	5.20	5.80	5.30	5.00	74.20
DAYS ≥ .10	3.90	4.50	4.30	4.00	4.40	2.90	2.50	3.00	2.70	3.00	2.90	3.50	41.60
DAYS ≥ .25	2.25	2.50	2.40	2.40	2.50	1.60	1.25	1.75	1.75	2.25	2.40	2.40	25.45
DAYS ≥ .50	.80	.90	1.00	1.20	1.00	.90	.70	.70	.60	1.20	1.00	.95	10.95
DAYS ≥ 1.00	.45	.35	.30	.25	.30	.20	.33	.23	.25	.35	.25	.30	3.56

FREQUENCY OF 24 - HOUR PRECIPITATION AT CHURCHILL CANYON - CAN #2
LATITUDE 39°02'N, ELEVATION 4760 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.81	.66	.54	.37	.43	.35	.57	.57	.40	.36	.52	.80	6.38
DAYS > .01	5.20	4.50	4.00	2.70	4.50	2.40	3.35	3.50	3.00	2.90	3.20	3.60	42.85
DAYS > .10	2.70	2.60	2.25	1.40	1.75	1.25	1.80	2.00	1.60	1.50	1.45	2.40	22.70
DAYS > .25	1.50	1.50	1.00	.17	.60	.60	.75	1.10	.40	.60	.80	1.80	10.82
DAYS > .50	.45	.50	.33	.08	.20	.33	.40	.40	.33	.33	.30	.65	4.30
DAYS > 1.00	.25	.17	.07	.04	.02	.06	.20	.11	.13	.08	.07	.25	1.45

FREQUENCY OF 24 - HOUR PRECIPITATION AT CHURCHILL CANYON - CAN #10
LATITUDE 39°02'N, ELEVATION 6400 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.74	1.40	1.16	.85	1.08	.94	.95	.87	.69	.86	1.16	1.74	13.44
DAYS > .01	7.80	8.00	7.00	5.30	7.00	5.10	5.00	5.40	4.50	5.25	5.30	5.80	71.45
DAYS > .10	4.60	5.00	3.80	2.60	3.75	2.70	2.75	3.00	2.60	2.65	3.00	4.10	40.55
DAYS > .25	3.20	2.80	2.20	1.40	2.20	1.55	1.30	1.55	1.45	1.85	2.40	3.00	24.90
DAYS > .50	1.40	1.10	.85	.60	.85	.95	.75	.65	.60	.93	1.10	1.35	11.13
DAYS > 1.00	.75	.40	.25	.12	.22	.20	.36	.22	.25	.32	.25	.50	3.84

FREQUENCY OF 24 - HOUR PRECIPITATION AT CARSON CITY
LATITUDE 39°09'N, ELEVATION 4651 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	2.18	1.98	1.17	.58	.59	.45	.29	.16	.30	.64	1.30	2.19	11.83
DAYS > .01	9.00	9.60	7.20	4.40	5.50	3.10	2.40	1.20	2.50	4.70	5.70	7.00	62.30
DAYS > .10	5.40	7.00	3.80	2.00	2.50	1.70	1.20	.40	1.40	2.20	3.50	4.80	35.90
DAYS > .25	3.90	3.80	2.20	.70	1.00	.70	.40	.20	.70	1.40	2.70	3.40	21.10
DAYS > .50	1.70	1.70	.90	.30	.40	.40	.30	.10	.15	.70	1.30	1.60	9.55
DAYS > 1.00	1.00	.60	.30	.08	.10	.08	.10	.02	.08	.30	.30	.80	3.76

FREQUENCY OF 24 - HOUR PRECIPITATION AT STEPTOE - CAN #6
 LATITUDE 38°50'N, ELEVATION 7400 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.01	1.02	1.22	1.36	1.18	.76	1.14	1.38	.92	1.06	.98	.97	13.00
DAYS > .01	5.90	6.00	7.20	6.50	7.20	4.10	5.90	7.00	5.40	5.80	5.00	3.90	69.90
DAYS > .10	3.00	3.90	4.10	3.70	3.75	2.25	3.15	3.80	2.90	3.00	2.60	2.60	38.95
DAYS > .25	1.80	2.35	2.40	2.40	2.25	1.00	1.65	2.40	2.10	2.25	2.20	2.00	24.80
DAYS > .50	.65	.80	1.00	1.20	1.00	.70	.80	.80	.95	1.20	.90	.85	10.85
DAYS > 1.00	.38	.27	.27	.28	.25	.13	.42	.31	.37	.37	.20	.28	3.53

FREQUENCY OF 24 - HOUR PRECIPITATION AT STEPTOE - CAN #10
 LATITUDE 38°50'N, ELEVATION 7900 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.22	1.20	1.37	1.44	1.22	.78	1.34	1.62	1.06	1.12	1.09	1.17	14.63
DAYS > .01	6.40	6.60	6.90	6.90	7.50	4.20	7.50	9.50	5.80	5.85	5.20	4.10	76.45
DAYS > .10	3.50	4.30	4.25	3.80	3.90	2.25	3.70	5.25	3.50	3.20	2.90	3.10	43.65
DAYS > .25	2.25	2.60	2.60	2.50	2.20	1.10	1.90	2.75	2.15	2.25	2.40	2.25	26.95
DAYS > .50	.80	.90	.90	1.25	1.00	.75	.60	1.25	1.15	1.20	1.00	.95	11.75
DAYS > 1.00	.50	.34	.25	.33	.25	.14	.34	.45	.40	.40	.13	.33	3.86

FREQUENCY OF 24 - HOUR PRECIPITATION AT DUCKWATER - CAN #24
LATITUDE 39°07'N, ELEVATION 6090 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.62	.64	.80	.92	.81	.53	.77	.93	.62	.72	.64	.60	8.60
DAYS > .01	4.50	4.50	5.70	5.50	6.50	3.40	4.40	5.80	4.40	4.90	4.30	3.40	57.30
DAYS > .10	2.40	2.50	3.00	2.80	3.30	1.70	2.40	3.20	2.40	2.40	1.80	1.80	29.70
DAYS > .25	1.10	1.50	1.60	1.50	1.60	.80	1.00	1.70	1.40	1.60	1.50	1.40	16.70
DAYS > .50	.33	.50	.60	.70	.60	.40	.60	.70	.45	.75	.60	.50	6.73
DAYS ≥ 1.00	.15	.15	.15	.15	.15	.08	.30	.25	.25	.30	.10	.20	2.23

FREQUENCY OF 24 - HOUR PRECIPITATION AT DUCKWATER - CAN #16
LATITUDE 39°07'N, ELEVATION 6675 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.92	.92	1.10	1.21	1.05	.67	1.10	1.34	.88	.94	.87	.89	11.89
DAYS > .01	5.70	5.80	6.80	6.50	7.20	4.00	5.80	8.50	5.50	5.60	4.80	3.90	70.10
DAYS > .10	2.90	3.50	3.80	3.70	3.70	2.00	3.00	4.50	3.00	2.80	2.50	2.80	38.30
DAYS > .25	1.70	2.20	2.10	2.10	2.00	1.00	1.60	2.40	2.00	2.10	2.20	1.90	23.30
DAYS > .50	.60	.75	.80	1.10	.80	.60	.80	1.10	.90	1.10	.80	.75	10.10
DAYS ≥ 1.00	.33	.30	.30	.25	.25	.13	.40	.35	.33	.35	.18	.30	3.47

FREQUENCY OF 24 - HOUR PRECIPITATION AT ELY
LATITUDE 39°17'N, ELEVATION 6253 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.68	.63	.85	1.03	.92	.92	.58	.51	.69	.66	.59	.65	8.71
DAYS > .01	4.50	4.30	6.00	6.00	7.00	5.30	3.60	3.50	4.80	4.70	4.00	3.30	57.00
DAYS > .10	2.50	2.50	3.20	3.20	3.50	2.80	1.80	1.80	2.40	2.20	1.80	1.90	29.60
DAYS > .25	1.00	1.40	1.70	1.80	1.80	1.70	.80	1.00	1.70	1.40	1.30	1.30	16.90
DAYS > .50	.33	.40	.50	.80	.70	.90	.45	.40	.60	.70	.50	.40	6.68
DAYS ≥ 1.00	.15	.15	.15	.20	.20	.20	.20	.10	.25	.25	.10	.15	2.10

FREQUENCY OF 24 - HOUR PRECIPITATION AT MATHEWS CANYON - CAN #9
LATITUDE 37°33'N, ELEVATION 5700 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.31	1.19	1.14	.86	.52	.28	1.41	1.59	1.13	.86	1.07	1.23	12.59
DAYS ≥ .01	5.50	6.20	6.40	5.00	4.50	1.80	7.20	8.80	5.20	5.50	4.80	3.80	64.70
DAYS ≥ .10	3.20	4.10	3.70	2.70	1.90	.80	4.10	5.00	3.40	2.70	2.80	2.70	37.10
DAYS ≥ .25	2.60	2.80	2.60	1.80	1.20	.40	2.20	2.50	2.30	2.10	2.50	2.30	25.30
DAYS ≥ .50	1.00	.90	1.20	.90	.40	.20	.85	1.10	1.30	1.00	1.00	1.10	10.95
DAYS ≥ 1.00	.70	.45	.20	.20	.08	.04	.75	.45	.40	.35	.25	.60	4.52

FREQUENCY OF 24 - HOUR PRECIPITATION AT MATHEWS CANYON - CAN #3
LATITUDE 37° 33'N, ELEVATION 5850 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.81	1.63	1.55	1.14	.69	.37	1.47	1.65	1.23	1.14	1.43	1.69	15.80
DAYS ≥ .01	6.80	7.50	7.50	5.70	5.50	2.30	7.60	9.00	5.40	6.30	5.50	4.70	73.80
DAYS ≥ .10	4.00	5.50	4.60	3.30	2.50	1.00	4.30	5.30	3.70	3.40	3.80	3.40	44.80
DAYS ≥ .25	3.50	3.60	3.40	2.40	1.60	.50	2.30	2.60	2.40	2.40	3.00	2.80	30.50
DAYS ≥ .50	1.70	1.40	1.70	1.20	.70	.30	.90	1.20	1.40	1.30	1.40	1.40	14.60
DAYS ≥ 1.00	.90	.60	.33	.30	.15	.06	.80	.50	.45	.40	.35	1.00	5.84

FREQUENCY OF 24 - HOUR PRECIPITATION AT PINE CANYON - CAN #8
LATITUDE 37°30'N, ELEVATION 5840 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.39 ²	1.25	1.19	.88	.54	.29	1.53	1.74	1.21	.89	1.11	1.30	13.32
DAYS ≥ .01	5.90	6.50	6.40	5.10	4.70	2.00	7.80	9.20	5.40	5.60	4.90	3.80	67.30
DAYS ≥ .10	3.25	4.00	3.80	2.80	1.60	.75	4.40	5.40	3.50	2.75	2.90	2.75	37.90
DAYS ≥ .25	2.60	2.90	3.10	2.00	1.20	.25	2.30	2.60	2.20	2.20	2.60	2.40	26.35
DAYS ≥ .50	1.25	.90	1.25	1.00	.50	.20	.95	1.20	1.30	1.00	1.10	1.15	11.80
DAYS ≥ 1.00	.75	.40	.20	.23	.07	.03	.75	.50	.40	.33	.25	.60	4.51

FREQUENCY OF 24 - HOUR PRECIPITATION AT PINE CANYON - CAN #3
LATITUDE 37°30'N, ELEVATION 6320 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.92	1.73	1.65	1.23	.75	.40	1.60	1.80	1.34	1.23	1.54	1.79	16.98
DAYS ≥ .01	7.00	7.70	7.80	6.00	5.50	2.50	8.20	9.80	5.70	6.50	5.70	4.80	77.20
DAYS ≥ .10	4.10	5.70	4.80	3.40	2.80	1.10	4.60	5.70	4.00	3.50	4.00	3.50	47.20
DAYS ≥ .25	3.70	3.70	3.50	2.50	1.70	.55	2.50	2.75	2.60	2.50	3.10	2.90	32.00
DAYS ≥ .50	1.80	1.40	1.80	1.25	.70	.30	1.00	1.35	1.50	1.35	1.60	1.40	15.45
DAYS ≥ 1.00	1.00	.70	.40	.33	.15	.06	.80	.60	.45	.40	.40	1.10	6.39

FREQUENCY OF 24 - HOUR PRECIPITATION AT LAS VEGAS
LATITUDE 36°05'N, ELEVATION 2162 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.48	.34	.42	.29	.08	.03	.47	.44	.37	.26	.38	.38	3.94
DAYS ≥ .01	1.80	2.40	2.30	2.20	2.00	1.00	2.80	2.40	2.00	2.80	1.50	1.80	25.00
DAYS ≥ .10	1.30	1.50	1.20	1.30	.50	.30	1.70	1.60	1.10	.80	.80	1.20	13.30
DAYS ≥ .25	1.20	.90	.90	.60	.10	.10	.70	.70	.40	.70	.70	.50	7.50
DAYS ≥ .50	.35	.15	.40	.20	.08	.05	.30	.30	.33	.33	.30	.30	3.09
DAYS ≥ 1.00	.10	.12	.04	.05	.01	.01	.25	.12	.12	.05	.07	.07	1.01

FREQUENCY OF 24 - HOUR PRECIPITATION AT MILL CREEK - CAN #1
LATITUDE 40°28'N, ELEVATION 5040 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.91	.92	1.05	1.21	1.26	.84	.61	.58	.54	.93	.87	.89	10.61
DAYS ≥ .01	6.60	7.00	7.80	6.80	8.50	5.70	4.00	4.00	4.60	5.50	5.25	5.30	71.05
DAYS ≥ .10	3.50	3.60	3.70	3.80	4.30	3.00	2.00	2.10	2.60	2.80	3.00	3.40	37.80
DAYS ≥ .25	1.60	1.85	1.80	2.00	1.90	1.70	.90	1.20	1.25	1.90	2.20	1.50	19.80
DAYS ≥ .50	.40	.50	.50	.80	.90	.90	.60	.40	.40	.90	.90	.50	7.70
DAYS ≥ 1.00	.22	.25	.20	.20	.20	.20	.20	.10	.15	.25	.15	.13	2.25

FREQUENCY OF 24 - HOUR PRECIPITATION AT MILL CREEK - CAN #6
LATITUDE 40°28' N, ELEVATION 6360 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	1.71	1.64	1.75	1.80	1.78	1.16	.68	.61	.66	1.39	1.42	1.65	16.25
DAYS ≥ .01	9.00	10.00	9.90	8.50	10.50	6.60	4.50	4.50	5.50	6.80	6.50	7.50	89.80
DAYS ≥ .10	5.25	6.25	5.90	5.40	5.80	3.80	2.25	2.25	2.90	3.90	3.90	5.10	52.70
DAYS ≥ .25	2.90	2.90	2.75	3.00	2.80	2.25	.90	1.40	1.50	2.40	2.70	2.75	28.25
DAYS ≥ .50	1.10	1.15	1.15	1.50	1.30	1.25	.70	.50	.50	1.50	1.50	1.15	13.30
DAYS ≥ 1.00	.50	.50	.45	.40	.38	.28	.25	.13	.20	.40	.40	.50	4.39

FREQUENCY OF 24 - HOUR PRECIPITATION AT COILS CREEK - CAN #5
LATITUDE 39°45'N, ELEVATION 6560 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.90	.90	1.01	1.13	1.17	.77	.71	.72	.60	.87	.83	.88	10.49
DAYS ≥ .01	6.00	6.30	7.00	6.40	8.00	5.00	4.40	5.00	4.70	5.40	4.80	4.40	67.40
DAYS ≥ .10	3.30	3.50	3.70	3.70	4.00	2.70	2.20	2.50	2.50	2.75	2.60	3.10	36.55
DAYS ≥ .25	1.60	2.00	1.90	1.90	1.90	1.40	1.00	1.40	1.40	1.80	2.00	1.75	20.05
DAYS ≥ .50	.50	.70	.70	.90	.80	.75	.70	.55	.40	.90	.75	.70	8.35
DAYS ≥ 1.00	.30	.25	.25	.20	.25	.20	.25	.18	.20	.30	.15	.20	2.73

FREQUENCY OF 24 - HOUR PRECIPITATION AT COILS CREEK - CAN #17
LATITUDE 39°45'N, ELEVATION 7020 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.86	.90	1.06	1.29	1.37	.92	.91	.93	.75	.99	.89	.85	11.72
DAYS > .01	5.80	6.30	7.30	6.80	8.50	5.50	5.40	6.30	5.50	5.70	5.00	4.20	72.30
DAYS > .10	3.20	3.50	3.80	4.00	4.50	3.10	2.70	3.10	2.90	2.90	2.80	2.90	39.40
DAYS > .25	1.50	2.00	2.00	2.20	2.40	1.70	1.40	1.80	1.75	2.10	2.10	1.70	22.65
DAYS > .50	.45	.70	.75	1.10	.95	.95	.80	.75	.70	1.05	.80	.65	9.65
DAYS > 1.00	.25	.25	.25	.25	.30	.25	.33	.25	.25	.33	.18	.18	3.07

FREQUENCY OF 24 - HOUR PRECIPITATION AT BATTLE MOUNTAIN
LATITUDE 40°39'N, ELEVATION 4513 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.71	.67	.66	.75	.92	.85	.30	.22	.32	.71	.66	.69	7.46
DAYS > .01	5.50	5.20	5.80	5.20	7.60	5.70	2.50	1.80	3.00	4.70	4.50	4.00	55.50
DAYS > .10	2.70	2.70	2.60	2.30	3.70	3.10	1.10	.80	1.70	2.40	2.40	2.80	28.30
DAYS > .25	.90	1.20	1.30	1.20	1.30	1.70	.60	.40	.70	1.30	1.60	1.20	13.40
DAYS > .50	.30	.30	.30	.60	.60	.80	.30	.20	.20	.60	.70	.40	5.30
DAYS > 1.00	.15	.20	.10	.10	.15	.20	.10	.02	.05	.20	.10	.10	1.47

FREQUENCY OF 24 - HOUR PRECIPITATION AT TONOPAH
LATITUDE 38°04'N, ELEVATION 5426 FT.

PARAMETER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
LONG-TERM MEANS IN INCHES	.31	.37	.55	.58	.47	.24	.43	.33	.40	.47	.45	.37	4.97
DAYS > .01	1.80	2.80	3.50	4.00	4.30	1.70	2.80	2.00	2.80	3.80	3.00	2.40	34.90
DAYS > .10	.80	1.60	1.80	2.00	1.80	.80	1.50	1.30	1.50	1.70	.90	1.00	16.70
DAYS > .25	.50	.80	1.20	.70	.80	.30	.60	.60	.90	1.00	.80	.50	8.70
DAYS > .50	.15	.15	.40	.40	.40	.20	.30	.25	.33	.50	.40	.20	3.68
DAYS > 1.00	.05	.10	.08	.09	.07	.04	.20	.08	.20	.18	.08	.08	1.25

Deficiency Index

The deficiency index, a measure of the degree of precipitation shortage, is a function of precipitation variability and the frequency of days with measurable precipitation. The probability of a moisture deficit is directly proportional to precipitation variability and inversely proportional to frequency. As the frequency of daily precipitation decreases, soil moisture becomes more difficult to maintain. Since the variability and frequency are dependent upon mean annual precipitation and latitude, the deficiency index is also a function of these two variables. The following can be concluded:

- 1) There is a decrease in deficiency index values with an increase in latitude.
- 2) Latitudinal control is stronger at wet locations than at dry locations, except in the summer (when there is little difference).
- 3) The mean precipitation has the greatest effect in the summer, when the deficiency index decreases rapidly with increasing monthly precipitation values.
- 4) The monthly deficiency index values are higher than the annual deficiency index because the monthly precipitation variability is higher than the annual variability.

The seven classes of deficiency are shown below:

Annual Deficiency Index

Low: under .12
Moderately low: .12-.16
Moderate: .16-.23
Moderately high: .23-.33
High: .33-.45
Very high: .45-.60
Extremely high: over .60

Following are the monthly and annual deficiency index values for the selected cans.

CAN	MONTHLY DEFICIENCY INDEX												ANNUAL INDEX
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
ROCK SPRINGS CAN #5	.25	.25	.25	.24	.21	.26	.39	.35	.31	.29	.29	.26	.14
ROCK SPRINGS CAN # 11	.33	.34	.34	.32	.27	.32	.46	.44	.39	.38	.39	.37	.19
CRANE SPRINGS CAN # 1	.33	.34	.30	.34	.31	.41	.45	.42	.44	.39	.39	.38	.20
CRANE SPRINGS CAN #11	.30	.29	.29	.30	.29	.37	.46	.45	.44	.36	.38	.34	.19
CON CREEK CAN #2	.35	.41	.43	.54	.34	.40	.50	.55	.57	.49	.46	.38	.25
CON CREEK CAN #16	.32	.38	.44	.40	.29	.32	.42	.50	.47	.41	.39	.35	.21
CROWLEY CREEK CAN #2	.26	.28	.32	.36	.26	.32	.48	.61	.56	.38	.35	.27	.19
CROWLEY CREEK CAN #10	.30	.32	.37	.33	.21	.25	.33	.41	.38	.32	.32	.27	.15
EASTGATE CAN #15	.33	.32	.31	.33	.32	.41	.43	.38	.42	.39	.39	.38	.20
EASTGATE CAN #22	.40	.41	.41	.42	.38	.54	.66	.66	.60	.48	.48	.47	.27
CHURCHILL CANYON CAN #2	.39	.43	.50	.63	.49	.68	.54	.52	.60	.62	.56	.47	.30
CHURCHILL CANYON CAN #10	.31	.31	.34	.41	.36	.42	.41	.40	.45	.42	.39	.36	.21

CAN	MONTHLY DEFICIENCY INDEX												ANNUAL
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	INDEX
STEPTOE CAN #6	.37	.36	.34	.36	.35	.48	.37	.32	.40	.40	.42	.45	.22
STEPTOE CAN #10	.35	.35	.34	.34	.34	.48	.31	.26	.35	.39	.41	.44	.21
DUCKWATER CAN #16	.37	.37	.35	.35	.35	.49	.37	.29	.40	.40	.43	.45	.22
DUCKWATER CAN #24	.43	.42	.40	.40	.38	.59	.45	.38	.46	.44	.47	.49	.25
MATHEWS CANYON CAN #3	.36	.34	.36	.41	.44	.72	.32	.27	.40	.40	.42	.43	.22
MATHEWS CANYON CAN #9	.40	.38	.40	.46	.50	.83	.33	.28	.42	.43	.46	.48	.24
PINE CANYON CAN #3	.35	.33	.35	.41	.44	.69	.29	.25	.35	.39	.41	.44	.21
PINE CANYON CAN #8	.38	.37	.40	.45	.49	.79	.31	.26	.41	.43	.46	.48	.24
MILL CREEK CAN #1	.32	.31	.33	.32	.30	.38	.49	.50	.47	.38	.38	.36	.20
MILL CREEK CAN #6	.26	.25	.24	.26	.26	.37	.50	.47	.42	.33	.31	.29	.17
COILS CREEK CAN #5	.35	.34	.34	.34	.32	.42	.45	.43	.45	.40	.41	.41	.22
COILS CREEK CAN #17	.36	.34	.32	.33	.31	.32	.40	.37	.41	.39	.37	.42	.21

The monthly deficiency index values are relative strictly to one another and are not to be confused with the seven classes of ANNUAL deficiency index. For example, an annual deficiency index value of .24 would be considered "moderately high." However, a MONTHLY deficiency index value of .24 would NOT be considered "moderately high."

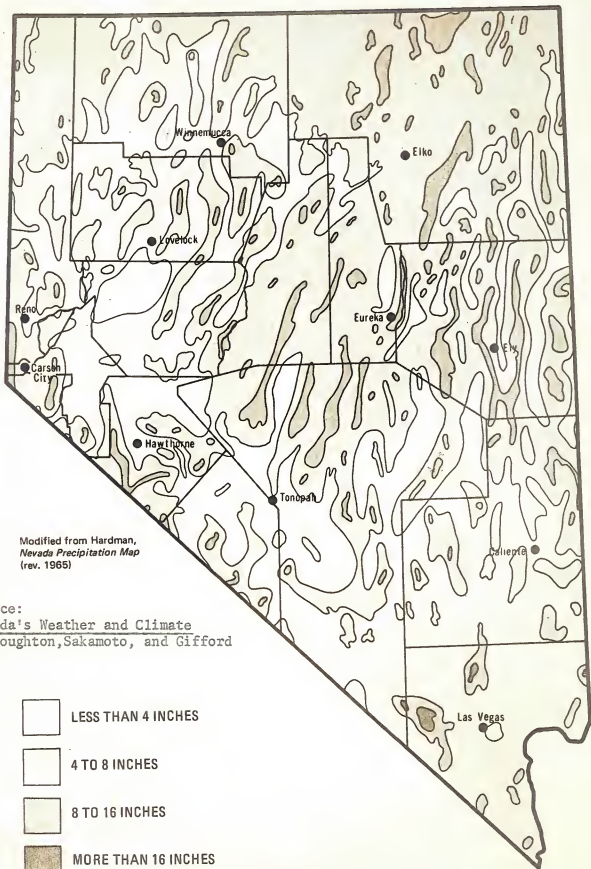
Comparisons can be made of your can's deficiency index value for any particular month with the distribution of all 24 cans from the 12 hydro areas throughout the state. For example, if your can has a June deficiency index of .68, your can would be one of two cans (8.3% of the 24 sample cans) within that deficiency index range. See the following table.

NUMBER AND PERCENTAGE DISTRIBUTION OF 24 CANS IN 12 HYDRO AREAS
THROUGHOUT DEFICIENCY INDEXES BY MONTH

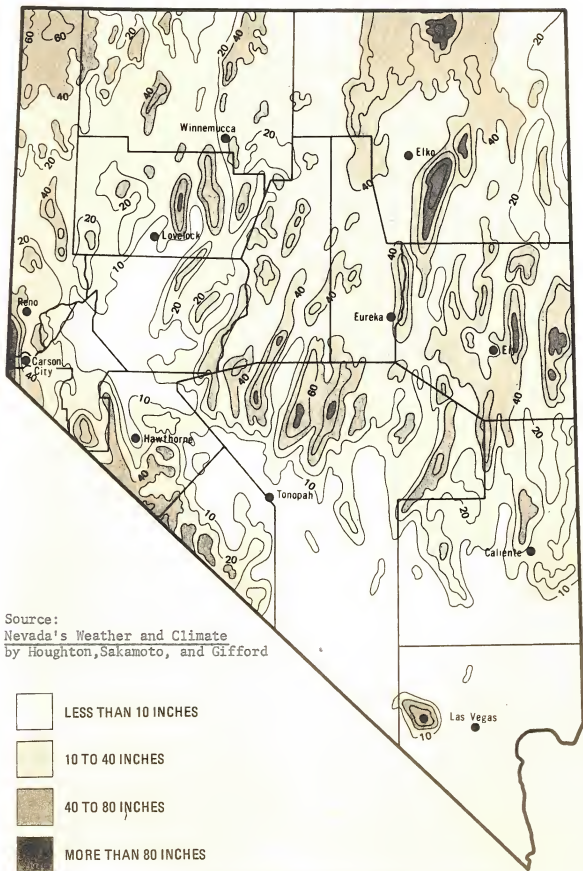
MONTHLY DEFICIENCY INDEX	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
.20-.29	3 12.5%	4 16.7%	3 12.5%	2 8.3%	7 29.2%	2 8.3%	1 4.2%	6 25.0%		1 4.2%	1 4.2%	4 16.7%
.30-.39	18 75.0%	16 66.6%	14 58.3%	12 50.0%	12 50.0%	7 29.2%	8 33.3%	5 20.8%	5 20.8%	11 45.8%	11 45.8%	8 33.3%
.40-.49	3 12.5%	4 16.7%	6 25.0%	8 33.3%	4 16.7%	8 33.3%	11 45.8%	7 29.2%	15 62.5%	11 45.8%	11 45.8%	12 50.0%
.50-.59			1 4.2%	1 4.2%	1 4.2%	2 8.3%	3 12.5%	4 16.7%	2 8.3%		1 4.2%	
.60-.69				1 4.2%		2 8.3%	1 4.2%	2 8.3%	2 8.3%	1 4.2%		
.70-.79						2 8.3%						
.80-.89						1 4.2%						

Generalized Statewide Maps

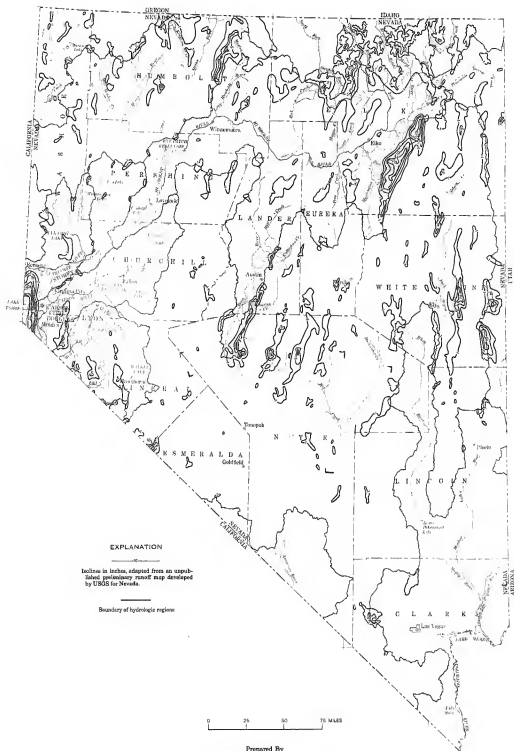
The following generalized statewide isoline maps present pertinent climatic information, some of which is outside the scope of the Nevada Watershed Studies. Analyses made from our studies are complemented by this additional precipitation, snowfall, runoff, temperature, and evaporation data. Information, by hydro area, has been taken from these maps and depicted in tabular form in the Summary section.



Average annual precipitation in Nevada.



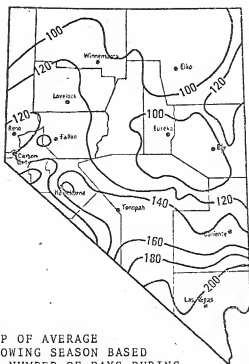
Mean annual snowfall in Nevada during the period 1939-1968.



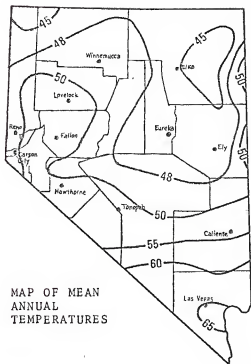
Prepared By
 STATE OF NEVADA
 DIVISION OF WATER RESOURCES
 STATE ENGINEER'S OFFICE
 1971
AVERAGE ANNUAL RUNOFF

Edited by B. R. Scott

Cerography by L. M. Rosch, Jr.
 with cooperation of
 Branch of Technical Illustrations
 U.S.G.S., Menlo Park, California.



MAP OF AVERAGE
GROWING SEASON BASED
ON NUMBER OF DAYS DURING
WHICH TEMPERATURES ARE
ALWAYS ABOVE 32 DEGREES F.

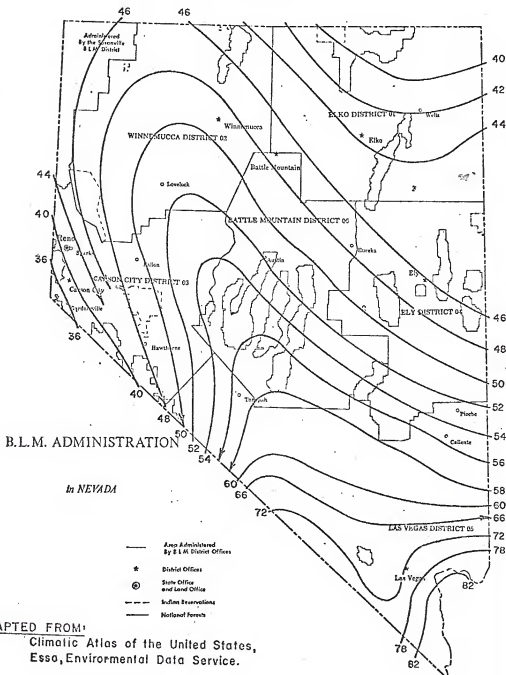


MAP OF MEAN
ANNUAL
TEMPERATURES

Source: Nevada's Weather and Climate
by Houghton, Sakamoto, and Gifford

MEAN ANNUAL LAKE EVAPORATION (inches)

NEVADA



ADAPTED FROM:
Climatic Atlas of the United States,
Esso, Environmental Data Service.

SUMMARY

The following summary is presented by topic in tabular form for ease in comparing one hydro area with another. Mean values for each hydro area were obtained by averaging values from the representative high and low elevation cans used in the analyses.

A comparison should be made between the precipitation information on the Occurrence of Peak Precipitation table, taken from Nevada Watershed Studies (NWS) data, and the Generalized Statewide Maps table, taken from the Average Annual Precipitation in Nevada map. The NWS precipitation data is geared more closely to BLM management needs because the data has been analyzed from an intensive network of recording and non-recording gages. The Average Annual Precipitation map data has, however, been extrapolated solely from macroscopic latitude and elevation information tied into a few stations and should not be heavily relied upon.

SUMMARY

OCCURRENCE OF PEAK PRECIPITATION

HYDRO AREA	AVERAGE ANNUAL PRECIPITATION IN INCHES	MONTHS IN WHICH PRECIPITATION PEAKS OCCUR OVER LONG-TERM	PRECIPITATION PEAK DURING 1976	PRECIPITATION PEAK DURING 1977
ROCK SPRINGS	10-17	MAY	APRIL, JULY-AUGUST	MAY
CRANE SPRINGS	10-14	APRIL-MAY	SEPTEMBER	JUNE (LOWER ELEVATIONS) MAY (HIGHER ELEVATIONS)
COW CREEK	6-10	MAY-JUNE	AUGUST	***
CROWLEY CREEK	10-14	MAY-JUNE, DECEMBER-JANUARY (LOWER ELEVATIONS) MAY-JUNE (HIGHER ELEVATIONS)	***	***
EASTGATE	7-13	APRIL-MAY	JULY	MAY-JUNE
CHURCHILL CANYON	6-14	DECEMBER-JANUARY	***	MAY
STEPTOE	11-15	APRIL, AUGUST	SEPTEMBER-OCTOBER	MAY
DUCKWATER	8-12	APRIL, AUGUST	***	***
PINE CANYON	13-17	DECEMBER-JANUARY, JULY-AUGUST	***	***
MATHEWS CANYON	12-16	DECEMBER-JANUARY, JULY-AUGUST	***	***
MILL CREEK	10-16	APRIL-MAY	SEPTEMBER	***
COILS CREEK	7-13	MAY	***	***

***Peaks can not be determined because of data gaps.

SUMMARY

MONTHLY AND ANNUAL VARIABILITY COEFFICIENTS
AVERAGED BETWEEN REPRESENTATIVE HIGH AND LOW ELEVATION GAGES BY HYDRO AREA

HYDRO AREA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
ROCK SPRINGS	.62	.63	.65	.57	.62	.65	.99	.96	.96	.70	.65	.62	.20
CRANE SPRINGS	.67	.69	.70	.69	.76	.83	.96	.95	.99	.80	.78	.69	.23
COW CREEK	.71	.73	.96	.88	.78	.78	.97	1.06	1.11	.88	.81	.69	.26
CROWLEY CREEK	.60	.63	.76	.71	.63	.64	.97	1.16	1.13	.73	.64	.58	.20
EASTGATE	.78	.77	.83	.82	.88	.95	.99	.98	.99	.93	.83	.77	.29
CHURCHILL CANYON	.77	.80	.91	.99	.99	1.01	.91	.92	1.01	1.02	.92	.77	.30
STEPTOE	.79	.79	.84	.81	.90	.95	.77	.67	.85	.91	.88	.79	.28
DUCKWATER	.81	.80	.87	.83	.91	1.09	.86	.78	.91	.94	.93	.80	.29
PINE CANYON	.86	.88	.98	1.03	1.09	1.22	.73	.63	.85	1.01	1.00	.91	.30
MATHEWS CANYON	.87	.88	.99	1.02	1.10	1.22	.78	.70	.90	1.02	1.00	.88	.31
MILL CREEK	.65	.65	.71	.64	.72	.80	1.06	.99	.99	.77	.70	.66	.23
COILS CREEK	.74	.74	.78	.75	.81	.89	.88	.88	.94	.86	.81	.75	.26

The above table allows for a comparison of the monthly and annual variability coefficients among the 12 hydro areas. The annual coefficients are always lower than the monthly coefficients. The variability is highest in July, August, and September in the northern part of Nevada. The variability is highest in May, June, and October in the southern part of Nevada. Variability generally decreases with increasing latitude.

SUMMARY

Orographic Lifting

For average increases in precipitation per 1000 foot increase in elevation, see Orographic Lifting table in Summary. As previously noted, the rate of precipitation increase is a function of topographic relief and of the moisture content of incoming air masses. The precipitation/elevation relationships vary not only according to the watersheds' locations statewide, but also according to their steepness and orientation.

The response of precipitation to elevation is generally greatest in the western Great Basin for most months and for the year because of the dominance of Pacific storms in the west. These Pacific frontal storms are accompanied by stronger winds blowing more perpendicular to the mountain ranges than is true for the Continental and Gulf components, which have more importance further east.

Precipitation increases have a tendency to drop off at the highest elevations in some watersheds, notably Rock Springs and Crane Springs. This occurs because air masses sometimes drop most of their moisture before reaching the highest elevations, or because high winds at upper elevations cause precipitation to be blown toward lower elevations on the leeward sides of slopes, causing a "spillover effect."

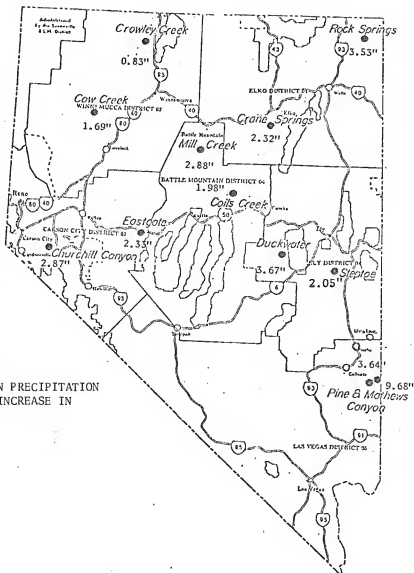
Before an attempt is made to extrapolate precipitation averages at higher elevations from cans located in valleys using any precipitation/elevation relationships from the twelve watersheds, a comparison should be made between the area being extrapolated and the appropriate watershed regarding elevation and relief similarities and proximity to a dominant topographic barrier.

SUMMARY
OROGRAPHIC LIFTING

Watershed	Equation of Best Fitting Line	r ²	Can Elevations			Average Annual Precipitation			Precipitation Increase Per 1000 Feet (in)
			Lowest	Highest (ft)	Range	Lowest	Highest (in)	Range	
Rock Springs	$\hat{y} = -8.64649 + 0.00352935x$	0.55	5500	7380	1880	9.75	16.52	6.77	3.53
Crane Springs	$\hat{y} = -1.19293 + 0.0023182x$	0.65	5320	6350	1030	10.53	13.47	2.94	2.32
Cow Creek	$\hat{y} = -0.680615 + 0.00169366x$	0.73	4500	6200	1700	6.58	10.01	3.43	1.69
Crowley Creek	$\hat{y} = 6.72717 + 0.000827006x$	0.52	4520	6990	2470	9.80	13.62	3.82	0.83
Churchill Canyon	$\hat{y} = -6.80215 + 0.00287359x$	0.66	4390	6960	2570	6.39	13.53	7.14	2.87
Eastgate	$\hat{y} = -4.24221 + 0.00232841x$	0.86	4900	7700	2800	6.99	13.23	6.24	2.33
Steptoe	$\hat{y} = -2.30788 + 0.00205321x$	0.54	7200	8000	800	10.79	14.73	3.94	2.05
Duckwater	$\hat{y} = -13.2831 + 0.00566719x$	0.86	5800	6675	875	7.86	11.89	4.03	3.67
Pine Canyon	$\hat{y} = -7.22377 + 0.00363434x$	0.64	5680	6520	840	13.00	16.98	3.98	3.64
Mathews Canyon	$\hat{y} = -41.2909 + 0.00965525x$	0.60	5600	5900	300	12.18	15.79	3.61	9.68
Mill Creek	$\hat{y} = -3.65013 + 0.00288398x$	0.77	5040	7000	1960	10.06	16.23	6.17	2.38
Coils Creek	$\hat{y} = -3.40422 + 0.00197859x$	0.06	6520	7820	1300	7.07	12.47	5.40	1.98

Note: $\hat{y}$ = Precipitation for a given elevation "x"
x = Elevation input

SUMMARY



OROGRAPHIC LIFTING
AVERAGE INCREASE IN PRECIPITATION
PER THOUSAND FOOT INCREASE IN
ELEVATION

SUMMARY
ANNUAL FREQUENCY OF 24-HOUR PRECIPITATION
BY HYDRO AREA WITH TOWNS INCLUDED

HYDRO AREA	DAYS $\geq$.01"	DAYS $\geq$.10"	DAYS $\geq$.25"	DAYS $\geq$.50"	DAYS $\geq$ 1.00"
ROCK SPRINGS	87	46	22	9	3
CRANE SPRINGS	73	40	21	9	3
ELKO	70	35	16	6	2
COW CREEK	61	31	14	6	2
CROWLEY CREEK	82	44	21	9	2
WINNEMUCCA	63	32	15	6	2
EASTGATE	62	34	19	8	3
CHURCHILL CANYON	57	32	18	8	3
CARSON CITY	62	36	21	10	4
STEPTOE	73	41	26	11	4
DUCKWATER	64	34	20	8	3
ELY	57	30	17	7	2
PINE CANYON	72	43	29	14	5
MATHEWS CANYON	70	41	28	13	5
LAS VEGAS	25	13	8	3	1
MILL CREEK	80	42	24	11	3
COILS CREEK	70	38	21	9	3
BATTLE MOUNTAIN	56	28	13	5	1
TONOPAH	35	17	9	4	1

Numbers of days at various precipitation intensities were averaged between representative high and low elevation cans by hydro area. The frequency of precipitation is a function of latitude, elevation, and exposure.

SUMMARY

MONTHLY AND ANNUAL DEFICIENCY INDEX
AVERAGED BETWEEN REPRESENTATIVE HIGH AND LOW ELEVATION CANS BY HYDRO AREA

HYDRO AREA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	DEFICIENCY CLASS
ROCK SPRINGS	.29	.30	.30	.28	.24	.29	.43	.40	.35	.34	.34	.32	.17	MODERATE
CRANE SPRINGS	.32	.32	.30	.32	.30	.39	.46	.44	.44	.38	.39	.36	.20	MODERATE
COW CREEK	.34	.40	.44	.47	.32	.36	.46	.53	.52	.45	.43	.37	.23	MODERATELY HIGH
CROWLEY CREEK	.28	.30	.35	.35	.24	.29	.41	.52	.47	.35	.34	.27	.17	MODERATE
EASTGATE	.37	.37	.36	.38	.35	.48	.55	.52	.51	.44	.44	.43	.24	MODERATELY HIGH
CHURCHILL CANYON	.35	.37	.42	.52	.43	.55	.48	.46	.53	.52	.48	.42	.26	MODERATELY HIGH
STEPTOE	.36	.36	.34	.35	.35	.48	.34	.29	.39	.40	.42	.45	.22	MODERATE
DUCKWATER	.40	.40	.38	.38	.37	.54	.41	.34	.43	.42	.45	.47	.24	MODERATELY HIGH
PINE CANYON	.37	.35	.38	.43	.47	.74	.30	.26	.40	.41	.44	.46	.23	MODERATELY HIGH
MATHEWS CANYON	.38	.36	.38	.44	.47	.78	.33	.28	.41	.42	.44	.46	.23	MODERATELY HIGH
MILL CREEK	.29	.28	.29	.29	.28	.38	.50	.49	.45	.36	.35	.33	.19	MODERATE
COILS CREEK	.36	.34	.33	.34	.32	.37	.43	.40	.43	.40	.39	.42	.22	MODERATE

The above table allows for a comparison of the monthly and annual deficiency index values among the 12 hydro areas. The annual values are always lower than the monthly values. There is a general decrease in the deficiency index values with increasing latitude.

SUMMARY
AVERAGE ANNUAL INFORMATION DERIVED FROM
SIX GENERALIZED STATEWIDE MAPS BY HYDRO AREA

HYDRO AREA	PRECIPITATION INCHES	SNOWFALL INCHES	RUNOFF INCHES	EVAPORATION INCHES	TEMPERATURE DEGREES FAHRENHEIT	GROWING SEASON DAYS
ROCK SPRINGS	8-16	20	<1	40	47	100
CRANE SPRINGS	8-16	30	<1	44	46	100
COW CREEK	4-8	20	<1	50	49	120
CROWLEY CREEK	4-8	10	<1	47	48	100
EASTGATE	8-16	10	<1	54	49	120
CHURCHILL CANYON	4-8	10	<1	44	50	120
STEPTOE	8-16	30	1	48	47	100
DUCKWATER	4-8	20	<1	49	47	100
PINE CANYON	8-16	20	<1	56	55	150
MATHEWS CANYON	8-16	15	<1	55	55	150
MILL CREEK	8-16	40	1	49	49	100
COILS CREEK	8-16	40	<1	47	47	100

The six generalized maps present snowfall, evaporation, and temperature data outside the scope of the Nevada Watershed Studies.

GLOSSARY

Continental component - represents that portion of precipitation arising from cyclonic activity over the continent, utilizing moisture from various sources

cyclonic activity - a storm with precipitation and winds rotating about a moving center of low atmospheric pressure

deficiency index - a measure of the degree of precipitation shortage; the higher the deficiency index value, the higher the probability of a moisture deficit

exceedance probability - the probability of a given precipitation intensity being equalled or exceeded

frequency - the number of days per month and per year that precipitation may be expected to occur

growing season - number of days per year during which temperatures are always above 32 degrees F.

Gulf component - represents that portion of precipitation arising from convective thunderstorms, utilizing moisture from the tropical oceans

isohyetal map - map showing lines of equal mean annual precipitation

isoline - a line on a map along which there is a constant value, as of precipitation or temperature

macroscopic - on a large-scale, regional basis

orographic lifting - the process by which air is lifted and cooled as it passes over a topographic barrier, the air dropping its moisture as it cools

Pacific component - represents that portion of precipitation arising from the Pacific Ocean moisture source

rain shadow - areas of low frequency precipitation that occur due to the air retaining more of its moisture as it warms while descending leeward slopes

standard deviation - the square root of the average of the squares of the deviation from the mean

transitory frontal system - an air mass which moves out of its source region and collides with other air masses of unlike qualities

variability - the tendency of monthly and annual precipitation amounts to change with respect to their long-term means

variability coefficient - also known in statistics as the coefficient of variation, the standard deviation of precipitation divided by the mean precipitation amount

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